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WESTERN WATER BULLETIN 1971

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Flow of  
The Colorado River  
and other  
Western Boundary Streams  
and  
Related Data

COLORADO RIVER

TIJUANA RIVER

SANTA CRUZ RIVER

SAN PEDRO RIVER

WHITEWATER DRAW

1971

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## FOREWORD

This bulletin is the twelfth annual compilation of stream discharges and other hydrographic data relating to the international aspects of the Colorado River below Imperial Dam, the Tijuana River and other streams crossing the western land boundary of the United States and Mexico. The compilation was prepared jointly by the United States and Mexican Sections of the International Boundary and Water Commission, solely for the purpose of presenting statistical data relating to stream flow and kindred subjects for the Colorado River from Imperial Dam to the Gulf of California, the Tijuana River and its important tributaries in the United States and Mexico, and other streams, including the Alamo and New Rivers which cross the California-Baja California boundary, and the Santa Cruz River and Whitewater Draw which cross the Arizona-Sonora boundary. This volume contains the information for the year 1971.

Stream gaging on the Colorado River below Imperial Dam began in 1902 when the station at Yuma, Arizona was established. Stage records have been obtained at this station since January 1878. Continuous stream gaging on the Tijuana River and its important tributaries in the United States and in Mexico began in 1936. Each government operates the gaging stations located within its own country.

### Colorado River below Imperial Dam

Below Imperial Dam, the Colorado River flows southward 10 miles to the mouth of the Gila River, thence westward 11 miles to Pilot Knob Mountain, and south 1 mile to the point where the northerly international land boundary, between California and Baja California, intersects the river. From this point the river continues to flow southward and forms the boundary between the United States and Mexico for a distance of about 22 miles to the point where the southerly international land boundary between Arizona and Sonora intersects the river. From this point the river continues to flow southward about 90 miles to discharge into the Gulf of California.

The ordinary flows of Colorado River below Imperial Dam are largely controlled by releases at Hoover Dam, completed in 1935. The releases are further regulated at Davis Dam, completed in 1950, and by Parker and Imperial Dams, completed in 1938. Small amounts of runoff may occasionally be contributed to the flow in the lower river from the usually dry arroyos draining the 10,900 square miles along the river from Hoover Dam to the mouth of the Gila River, not including 5,500 square miles in the Bill Williams River watershed. In addition, flows ranging from usually minor amounts to infrequent torrential floods may enter the lower Colorado River from the Bill Williams River and from the Gila River, draining about 7,300 square miles below Painted Rock Dam and Reservoir, completed in January 1960.

At Imperial Dam, diversions are made to Gila Gravity Main Canal and All-American Canal for irrigation projects in Arizona, including the Yuma Valley, Gila and Wellton-Mohawk projects, and in California, including the Imperial Valley, Coachella Valley and Reservation Division of Yuma Project. Also, under the provisions of the 1944 Water Treaty, there may be diverted to the All-American Canal at Imperial Dam for delivery to Mexico in the Alamo Canal, or substitute canal, at the northerly boundary, a portion of Mexico's guaranteed annual allotment of waters of the Colorado River. No such diversions were made in 1971.

Below Laguna Dam, measured and unmeasured flows are returned to the river principally as waste and drainage water from the irrigation projects in the United States. Waste and drainage waters from irrigation projects in the United States also cross the boundary into Mexico near San Luis, Arizona without returning to the river in the United States.

In the limitrophe section of the river, 1.1 miles downstream from the northerly boundary, Morelos Dam, the principal diversion structure for Mexico, was completed and placed in operation on November 8, 1950. Since that date all of Mexico's guaranteed treaty allotment of Colorado River water has been delivered in the limitrophe section of the river. The greater portion of such deliveries has been diverted to the Alamo Canal at Morelos Dam.

### Tijuana River Basin

The total drainage area of the Tijuana River basin is 1,731 square miles of which 27 percent lies in the United States and 73 percent in Mexico. This river is formed by the principal tributaries, Cottonwood Creek, which rises in the United States and Rio de las Palmas, which rises in Mexico. Cottonwood Creek crosses the international land boundary 21 miles from the Pacific Ocean to join the Rio de las Palmas in Mexico. From the confluence of these tributaries, the Tijuana River flows northwesterly 5 miles to cross the land boundary into the United States near San Ysidro, California, and Tijuana, Baja California, and then flows westerly 6 miles to discharge into the Pacific Ocean 2 miles north of the boundary. The flow of Cottonwood Creek is partially controlled by Barrett and Morena Reservoirs in the United States and the flow of the Rio de las Palmas is partially controlled by Rodriguez Reservoir in Mexico.

### Whitewater Draw near Douglas, Arizona

Whitewater Draw rises in the United States and flows south into Mexico crossing the international boundary near Douglas, Arizona, eventually discharging into the Gulf of California through the Yaqui River in Mexico. The total drainage area above the Douglas Gaging Station is 1,023 square miles. A number of mountain streams in the upper reaches of the basin are diverted for irrigation but they would normally sink or go to ground water before reaching the main water course.

## FOREWORD

### San Pedro River at Palominas, Arizona

The San Pedro River rises in Mexico and flows north into the United States crossing the boundary near Palominas, Arizona, and thence northwesterly into the Gila River. The river in the vicinity of the international boundary drains an area of 741 square miles of which 649 square miles are in Mexico.

### Santa Cruz River near Nogales and Lochiel, Arizona

The Santa Cruz River rises in the United States and flows south into Mexico crossing the international boundary near Lochiel, Arizona, and returns to the United States near Nogales, Arizona, eventually discharging into the Gila River southwest of Phoenix, Arizona. The drainage area of the Santa Cruz River above Nogales station is 533 square miles. Of this amount, 348 square miles lie in Mexico. There are a few ground water irrigation diversions above the Lochiel station in Arizona and an unknown amount of water diverted for irrigation in Mexico.

## Acknowledgments

Other agencies which have contributed to the data published herein include the Bureau of Reclamation and the Geological Survey of the U. S. Department of the Interior; the National Weather Service, Department of Commerce; the Yuma County Water Users' Association; the Imperial Irrigation District; the city of San Diego, California; and the Ministry of Hydraulic Resources of Mexico. Specific notation is made of each of the above-named agencies, where the data appear. The courtesy and cooperation of those who have made these contributions are acknowledged with appreciation.

## Units of Measure

Data collected by the Mexican Section are computed and published in a Spanish version of the water bulletin in metric units. The Mexican data are converted and reported in this bulletin in English units. Conversion factors conform generally to those in the National Bureau of Standards Miscellaneous Publication 286 "Units of Weight and Measure (United States Customary and Metric) - Definitions and Tables of Equivalents". However, for convenience some of the factors have been shortened and modified to facilitate conversion, reversion to the original units when necessary, and checking of data. Conversion of the mean daily discharges, the monthly average discharge, and the monthly and annual volumes from metric to English units is direct. For this reason the monthly average discharge in cubic feet per second and monthly volumes in acre-feet shown for gaging stations operated by the Mexican Section cannot necessarily be obtained in the usual manner from the total monthly flow in second-foot days. For the same reason, evaporation and rainfall data, when totaled, may not be equivalent to the direct conversion from metric to English units. The following factors have been used for data in this bulletin:

<u>METRIC UNITS</u>	<u>ENGLISH UNITS</u>
<u>LENGTH</u>	
1 Centimeter	0.393701 Inch
1 Meter	3.28034 Feet
1 Kilometer	0.621371 Mile
<u>AREAS</u>	
1 Square Meter	10.76391 Square Feet
1 Hectare	2.471054 Acres
1 Square Kilometer	0.386102 Square Mile
<u>VOLUME</u>	
1 Cubic Meter	61023.74 Cubic Inches
1 Cubic Meter	35.31467 Cubic Feet
1 Cubic Meter	1.30795 Cubic Yards
1000 Cubic Meters	0.81071 Acre-Foot
1 Liter	0.264172 U.S. Gallon
<u>WEIGHTS</u>	
1 Kilogram	2.204623 Pounds
1 Metric Ton	2204.623 Pounds
1 Metric Ton	1.102311 Short Tons (2000 lbs.)

## GENERAL HYDROLOGIC CONDITIONS FOR 1971

### Colorado River

Normally, there is no measurable amount of runoff from the portion of the Colorado River basin in the United States and Mexico below Hoover Dam, not including Bill Williams and Gila Rivers. There was no significant amount in 1971. The average seasonal (October 1970-September 1971) rainfall over the upper basin, as gaged at 13 index stations, was about 12.1 inches compared to a seasonal average of about 13.75 inches for the 49 seasons (1923-1971). In the lower basin of the Colorado River in Mexico, from Morelos Diversion Dam to the Gulf of California, the average precipitation (1971) measured at 6 index stations was 2.48 inches compared to an average of 2.24 inches during the last 13 years (1959-1971).

The flow of the Colorado River reaching Imperial Dam was 5,828,800 acre-feet, about 70% of the 37-year average (1935-1971) of 8,341,849 acre-feet. At the northerly international boundary, the total flow of the river during 1971 was 1,316,193 acre-feet, about 34% of the 1935-1971 average of 3,858,830 acre-feet. At the southerly international boundary, the flow during 1971 was only 85,172 acre-feet, or about 3% of the 1935-1971 average of 3,049,107 acre-feet. The total flow of the Colorado River reaching the M. C. Rodriguez gaging station, 24.5 miles downstream from the southerly international boundary, and 4.5 miles upstream from the Sonora-Baja California railroad bridge, was 25,036 acre-feet in 1971, about 2.1% of the 1951-1971 average of 1,211,241 acre-feet.

The total of all flows of the Colorado River entering Mexico in 1971 amounted to 1,561,622 acre-feet, 35% of the 1935-1971 average of 4,493,407 acre-feet, as measured 1) in the Colorado River at the northerly international boundary, 2) in the Walliton-Mohawk Main Outlet Drain Extension near Morelos Dam, 3) in the wasteways that discharge into the limitrophe section of the river from the United States bank, and 4) in the canal which discharges waste and drainage waters from the Yuma Project across the southerly land boundary into Mexico near San Luis, Arizona, less diversions in the United States by pumps in the limitrophe section.

No flood peaks of importance occurred in streams of the lower Colorado River basin during 1971. A maximum instantaneous flow of 3,430 second-feet occurred in the Colorado River at the northerly boundary station on April 10.

Stored waters at the end of the year in the three major reservoirs on the Colorado River below Lee's Ferry amounted to 19,724,800 acre-feet, 69% of the usable capacity of 28,588,400 acre-feet. The greater part (17,645,000 acre-feet) of the storage was contained in Lake Mead (Hoover Dam). There were no reported shortages of Colorado River water for irrigation during 1971 due to drought or accident to the irrigation system.

The total reported acreage irrigated from waters of the Colorado River below Imperial Dam in 1971 was 1,087,786 acres; 658,698 acres in the United States and 429,088 acres in Mexico. An estimated one-third of acreage in Mexico is served by pumping from ground water.

The suspended sediment load passing the northerly boundary station in 1971 was 75.0 acre-feet, about 26% of the 1956-1971 average of 288 acre-feet.

### Tijuana River Basin

During 1971, the temperatures at Barrett Dam, California (elevation 1,750 feet) in the upper portion of the basin in the United States averaged 60.2 degrees, 1.1 degrees below the 41-year mean. In the extreme upper portion of the basin in Mexico at San Juan de Dios, Baja California (elevation 3,280 feet), the recorded temperatures during the year averaged 54 degrees, 1.8 degrees below the long-term average, and at Rodriguez Dam, Baja California (elevation 459 feet), the recorded temperatures averaged 63 degrees, equal to the mean of many years.

At Barrett Dam in the upper portion of the basin in the United States, the recorded precipitation was 11.54 inches, 66% of normal, and at Chula Vista near the lower end of the basin, 5.87 inches, or 61% of normal. The recorded precipitation at San Juan de Dios in the upper portion of the basin in Mexico, was 11.93 inches, approximately 78% of the normal during the 16-year period, and at Rodriguez Dam in the lower portion of the basin in Mexico, 4.61 inches, 58% of the 34-year average.

Runoff in the basin during 1971 averaged less than 6% of normal. Above Morena Reservoir the runoff was 658 acre-feet, or about 11% of the 35-year 1937-1971 mean of 5,924 acre-feet. At Rodriguez Reservoir, the runoff was 615 acre-feet, or about 4% of the 34-year mean of 13,854 acre-feet.

The flow of the Tijuana River at the international boundary was 153 acre-feet during 1971, and the flow in the Tijuana River near Nestor was 0 acre-feet.

### Whitewater Draw

During 1971, the average annual temperature over the watershed was slightly below normal, while the annual precipitation was about normal. Runoff for the year at the gaging station near Douglas, Arizona, of 10,353 acre-feet was about 149% of average.

## GENERAL HYDROLOGIC CONDITIONS FOR 1971

### San Pedro River

During 1971, the average annual temperature was below normal. The annual precipitation, as measured at Coronado National Monument Headquarters, was 102% of the 1961-1971 mean of 20.02 inches. The stream flow at the international boundary was 37,952 acre-feet, 170% of the 1951-1971 normal.

### Santa Cruz River

During 1971, the average annual temperature over the watershed was somewhat below normal and the annual precipitation was about 115% of the 33-year 1939-1971 mean. Runoff measured at the Nogales gaging station where the stream re-enters the United States was 21,100 acre-feet. The total runoff for the year measured at the gaging station near Lochiel, Arizona, where the stream enters Mexico from the United States, was 2,405 acre-feet. Therefore, neglecting stream flow depletions in Mexico, the records indicate a contribution of about 18,965 acre-feet from the loop of the river lying in Mexico, or approximately 89% of the flow reaching the Nogales station.

### Alamo and New Rivers

During 1971, the average annual temperature over the drainage areas of the Alamo and New Rivers, as recorded at El Centro, California, and at Mexicali, Baja-California, was 71.0 and 70.0 degrees, respectively, 1.3 and 1.8 degrees below the respective normals.

At El Centro, the precipitation was 0.44 inches, about 18% of the 41-year average, and in Mexicali, the annual precipitation was 1.10 inches, 37% of the 46-year average. The total flow of the New River at the international boundary in 1971 was 107,281 acre-feet, which was about 144% of the 1943-1971 normal.

### Salton Sea

During 1971, the average annual temperature around the Salton Sea was about 96% of the long-term average, while the annual precipitation recorded at Brawley, California was approximately 70% of the long-term mean of 2.33 inches. The water surface of the Salton Sea remained more or less the same during the year. The maximum stage, 231.7 feet below mean sea level, was recorded on April 6-17, inclusive. The minimum stage, 232.6 feet below mean sea level, was recorded on January 1-4 and October 19 to November 18, inclusive.

## COLORADO RIVER AT YUMA, ARIZONA - STAGES

**DESCRIPTION:** Water-stage recorder 200 feet upstream from lower highway bridge, 6.9 miles upstream from the northerly international land boundary, 2,100 feet downstream from the upper highway and railroad bridges at Yuma, Arizona, 4.7 miles downstream from the mouth of the Gila River, 19.1 miles downstream from Imperial Dam, and 0.3 mile upstream from the mouth of the Yuma Main Canal Wasteway. Zero of gage is at mean sea level, U. S. C. & G. S. datum.

**RECORDS:** Mean daily gage heights are based on continuous water-stage records. Records available: Gage heights, January 1878 through August 10, 1965, furnished by the U. S. Geological Survey. From August 11, 1965 through 1971, records obtained by the United States Section of the Commission.

**EXTREMES:** Prior to 1935: Maximum gage height 136.79 feet on January 22, 1916; minimum gage height 115.49 feet on September 17, 1917. Since 1935: Maximum gage height 127.36 feet on September 7, 1939; minimum gage height 111.22 feet on July 16, 1947.

## Mean Daily Gage Height in Feet 1971

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	112.92	112.97	112.99	113.68	113.33	113.63	112.86	113.07	113.52	114.85	112.89	112.98
2	112.93	112.94	112.87	113.58	113.36	113.42	113.07	113.09	113.56	113.58	112.88	112.97
3	112.94	112.96	112.88	113.21	113.30	113.46	113.62	113.10	113.51	113.21	112.91	112.97
4	112.91	113.22	112.96	113.17	113.89	113.42	113.46	113.09	113.51	112.97	112.84	112.99
5	* 112.93	113.43	113.12	113.35	113.31	112.75	113.07	113.16	113.50	112.93	112.88	112.97
6	# 113.55	113.47	113.11	113.67	113.36	112.79	113.03	113.21	113.49	112.96	112.87	112.90
7	# 113.20	113.49	113.10	113.68	113.30	112.80	113.00	113.25	113.44	112.94	112.87	112.89
8	# 113.10	113.54	113.10	113.57	113.31	112.77	113.05	113.29	113.47	112.93	112.83	112.95
9	# 113.02	113.50	113.11	113.24	113.29	112.75	112.98	113.23	113.50	112.92	112.82	113.08
10	# 113.35	113.58	113.10	113.26	113.25	112.79	112.97	113.09	113.49	112.88	112.85	113.10
11	# 113.15	113.59	113.12	113.28	113.29	112.79	112.99	113.07	113.45	112.87	112.82	112.85
12	# 113.05	113.51	113.13	113.18	113.29	112.68	112.99	113.09	113.32	112.87	112.82	112.82
13	# 113.02	113.04	113.11	113.11	113.28	112.51	112.98	113.17	113.07	112.86	112.83	112.82
14	# 113.03	113.02	113.12	113.09	113.27	112.51	113.10	113.21	113.10	112.85	112.96	112.79
15	# 113.00	113.15	113.12	113.12	113.26	112.59	113.16	113.23	113.09	112.85	112.89	112.79
16	# 112.98	112.99	113.20	113.13	113.26	112.72	113.14	113.03	112.80	112.83	113.02	112.79
17	# 112.99	112.93	113.33	113.23	113.28	112.83	113.20	113.24	112.71	112.87	113.11	112.79
18	# 112.96	112.88	113.28	113.27	113.29	112.95	113.20	* 113.46	112.70	112.82	112.88	112.79
19	# 112.95	112.90	113.26	113.34	113.23	113.12	113.18	# 113.30	112.71	112.81	112.87	112.80
20	* 112.97	112.91	113.27	113.46	113.23	113.05	113.13	# 113.11	112.71	112.83	112.85	112.79
21	112.99	113.21	113.20	113.24	113.31	112.99	113.12	# 113.20	112.72	112.87	112.89	112.80
22	112.99	113.39	113.16	113.30	113.28	112.95	113.09	# 113.21	112.70	112.88	112.87	112.80
23	112.95	113.27	113.13	113.21	113.25	112.93	113.09	* 114.51	112.70	112.83	112.87	112.80
24	112.95	113.13	113.17	113.12	113.22	112.96	113.09	113.47	112.70	112.82	112.86	112.79
25	112.96	113.16	113.19	113.10	113.24	112.86	113.06	113.37	112.63	112.85	112.84	112.77
26	112.97	113.20	113.19	113.09	113.24	112.79	113.04	113.76	112.63	112.82	112.84	112.76
27	112.97	113.16	113.20	113.07	113.29	112.82	113.04	113.37	112.68	112.83	112.83	112.77
28	112.99	113.13	113.44	113.03	113.25	112.82	113.03	112.91	112.74	112.88	112.83	112.77
29	112.95		113.67	113.09	113.24	112.74	112.98	112.84	112.91	112.83	112.89	112.77
30	112.97		113.66	113.78	113.19	112.85	113.04	112.86	114.96	112.88	112.94	112.80
31	112.98		113.68		113.26		113.05	113.66		112.89		112.85
Avg.	113.02	113.20	113.19	113.29	113.28	112.90	113.09	113.25	113.13	112.97	112.88	112.86

\* Partly Estimated

# Estimated



## RESERVATION MAIN DRAIN NO. 4 (CALIFORNIA DRAIN)

**DESCRIPTION:** Water-stage recorder (digital) located 500 feet upstream from the U. S. Highway No. 80 crossing and one mile northwest of Yuma, Arizona. Discharge measurements are made from a footbridge immediately below the gage. The drainage canal discharges into the outfall channel of the Yuma Main Canal Wasteway 200 feet downstream from the spillway structure, and thence into the Colorado River on the right bank, 1,000 feet upstream from Colorado River below Yuma Main Canal Wasteway, and 6.5 miles upstream from the northerly international boundary. Prior to October 1955, published as "California Drainage Canal near Yuma, Arizona."

**RECORDS:** Based on current meter measurements and a continuous record of gage heights. Records are computed and furnished by the U. S. Geological Survey. Records available: Monthly discharge, January 1913 to April 1920, October 1921 to March 1925, and January 1934 to September 1947; daily and monthly discharge, October 1947 through 1971.

**REMARKS:** Reservation Main Drain No. 4 collects drainage and wastewater from the area east of the Yuma Main Canal on the Reservation Division of the Yuma Project, located in California. Since 1939, collection of seepage from the All-American Canal has caused large increases in drainage flows. Average annual flow prior to 1937 was 12,800 acre-feet. Monthly and annual averages since 1937 are shown in the table below.

**EXTREMES:** Prior to 1937: Maximum annual flow 20,190 acre-feet, 1916; minimum annual flow 8,920 acre-feet, 1913.

## Mean Daily Discharge in Second Feet 1971 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	38	38	46	55	49	55	52	53	49	76	67	59
2	41	39	45	60	54	52	47	48	62	60	64	56
3	39	41	44	60	49	52	50	48	60	57	64	53
4	42	46	40	55	50	55	54	56	60	56	61	54
5	38	45	40	55	49	64	54	54	59	65	66	53
6	41	43	39	55	51	68	52	50	58	61	61	56
7	41	43	39	55	50	47	52	50	57	56	58	60
8	38	42	38	55	50	48	56	54	61	62	62	54
9	48	43	49	55	50	52	64	48	60	53	60	51
10	50	42	47	55	49	57	58	52	61	56	82	55
11	45	42	38	55	50	50	59	54	58	57	59	60
12	40	43	38	55	52	62	60	54	55	56	54	56
13	40	53	36	50	53	62	57	56	48	57	53	54
14	43	49	44	55	52	56	48	55	51	58	59	53
15	39	46	41	55	52	55	50	57	54	61	59	58
16	41	46	40	55	49	53	57	64	78	62	57	52
17	43	48	38	50	48	49	56	60	66	69	57	48
18	44	40	40	60	50	45	53	59	67	66	64	49
19	41	44	42	47	53	44	48	58	67	68	58	48
20	41	41	44	47	51	45	51	64	61	66	61	48
21	42	41	46	49	51	49	53	84	68	68	61	53
22	42	43	48	52	59	55	50	78	63	64	56	45
23	41	42	46	53	51	65	48	67	68	62	56	49
24	42	49	53	56	50	56	54	57	58	73	56	52
25	42	51	50	66	49	54	51	57	61	68	54	48
26	41	47	47	58	49	53	51	57	67	63	54	48
27	43	49	48	61	50	62	50	60	58	65	54	47
28	48	49	59	58	54	50	51	63	53	67	53	47
29	39		55	59	51	52	50	61	67	61	51	50
30	40		55	55	49	54	51	56	72	60	53	51
31	41		55		49		59	63		71		48
Sum	1,294	1,245	1,390	1,656	1,573	1,621	1,648	1,797	1,827	1,944	1,774	1,619
Current Year 1971												
Period 1937-1971												
Month	Extreme Gage Feet		Extreme Second Feet				Average Second Feet	Total Acre Feet	Acre Feet			
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum	
Jan.			10	50	† 1	38	41.7	2,567	3,227	4,780	877	
Feb.			13	53	1	38	44.5	2,469	3,074	4,320	563	
Mar.			28	59	13	36	44.8	2,757	3,744	5,240	1,240	
Apr.			25	66	† 19	47	55.2	3,285	3,786	5,250	1,160	
May			22	59	17	48	50.7	3,120	3,891	5,590	992	
June			6	68	19	44	54.0	3,215	3,786	5,580	885	
July			9	64	2	47	53.2	3,269	4,079	6,550	816	
Aug.			21	84	† 2	48	58.0	3,564	4,048	6,810	861	
Sept.			16	78	13	48	60.9	3,624	3,808	6,220	889	
Oct.			1	76	9	53	62.7	3,856	3,817	5,740	1,040	
Nov.			10	82	29	51	59.1	3,519	3,552	5,490	994	
Dec.			† 7	60	† 27	47	52.2	3,211	3,440	4,960	966	
Yearly				84		36	53.1	38,456	44,252	63,700	12,840	

‡ Mean daily

† And other days

## YUMA MAIN CANAL WASTEWAY TO COLORADO RIVER AT YUMA, ARIZONA

**DESCRIPTION:** The wasteway receives water from the Yuma Main Canal at the check structure on the canal, 1,645 feet upstream from the intake of the Colorado River siphon, and 3.2 miles downstream from the Siphon Drop Power Plant. This wasteway discharges into the Colorado River on the California side, 1,000 feet upstream from Colorado River below Yuma Main Canal Wasteway, and 6.5 miles upstream from the northerly international land boundary.

**RECORDS:** Discharge is computed as the difference between the measured discharge of the Yuma Main Canal at the Siphon Drop Power Plant upstream and that of the same canal below the Colorado River siphon, with deductions for small irrigation diversions from the canal between the two gaging stations. 1971 records good except those below 125 second-feet, which are fair. Records obtained and furnished by U.S. Geological Survey. Records available: April 1913 through 1971.

**REMARKS:** The wasteway discharges to the river the flow in excess of irrigation water in the Yuma Main Canal. This excess flow, in addition to the irrigation water, was diverted from the All-American Canal into the Yuma Main Canal and utilized for power purposes at the Siphon Drop Power Plant.

**EXTREMES:** Prior to 1935, when storage began in Lake Mead: Average annual flow, 297,800 acre-feet; maximum annual flow, 913,700 acre-feet, 1932; minimum annual flow, 114,900 acre-feet, 1917. Since 1935: Maximum mean daily discharge, 2,020 second-feet, December 24-25, 1948; minimum mean daily discharge, no flow on numerous occasions.

## Mean Daily Discharge in Second Feet 1971 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	6.1	273	6.7	9.7	542	850	7.7	9.5	857	11.0	54.0	80.0
2	6.1	280	6.7	9.9	569	836	11.0	10.0	895	11.0	76.0	78.0
3	6.1	320	6.7	9.8	567	922	11.0	11.0	818	11.0	98.0	100
4	6.1	680	6.7	12.0	662	826	12.0	11.0	811	11.0	126	110
5	6.1	823	6.7	9.2	592	11.0	10.0	11.0	808	11.0	134	106
6	7.1	931	6.7	9.2	658	12.0	9.5	11.0	819	14.0	127	94.0
7	6.7	886	6.7	9.2	650	11.0	9.5	11.0	834	11.0	132	124
8	6.7	834	6.7	9.0	691	11.0	9.5	11.0	852	13.0	141	157
9	70.0	913	6.8	9.1	635	9.0	9.5	11.0	863	16.0	152	449
10	830	918	6.7	9.5	624	8.8	9.5	12.0	806	20.0	165	360
11	519	817	16.0	13.0	702	9.3	9.5	11.0	790	28.0	118	9.5
12	300	638	6.7	11.0	694	12.0	9.5	12.0	676	30.0	154	8.9
13	305	10.0	6.7	9.7	683	15.0	9.5	11.0	496	36.0	132	8.4
14	288	8.9	6.7	15.0	686	16.0	11.0	11.0	577	50.0	41.0	8.4
15	281	9.5	6.7	14.0	676	15.0	9.5	11.0	511	53.0	7.7	8.4
16	203	10.0	6.7	12.0	666	15.0	9.5	11.0	17.0	70.0	0	8.4
17	193	11.0	6.7	14.0	665	15.0	10.0	11.0	19.0	77.0	0	8.4
18	204	14.0	7.2	18.0	588	14.0	10.0	11.0	18.0	91.0	41.0	8.4
19	195	15.0	6.7	18.0	618	11.0	9.5	11.0	16.0	96.0	110	9.5
20	209	16.0	6.7	14.0	568	11.0	9.5	11.0	20.0	101	89.0	8.9
21	207	20.0	6.7	18.0	610	11.0	12.0	11.0	20.0	91.0	104	8.9
22	235	15.0	6.7	18.0	531	11.0	10.0	11.0	16.0	70.0	114	8.9
23	270	14.0	8.4	17.0	548	11.0	10.0	11.0	15.0	82.0	125	8.9
24	254	13.0	9.2	17.0	596	11.0	9.9	11.0	12.0	77.0	133	8.9
25	261	9.5	7.4	15.0	708	11.0	9.5	11.0	28.0	87.0	170	14.0
26	272	7.2	8.3	13.0	709	12.0	9.5	11.0	24.0	87.0	144	15.0
27	277	7.2	8.0	15.0	700	11.0	9.5	11.0	27.0	87.0	138	12.0
28	264	6.8	9.0	16.0	682	11.0	12.0	11.0	26.0	87.0	125	9.5
29	239		9.4	178	689	11.0	12.0	11.0	40.0	96.0	198	9.5
30	270		10.0	925	674	11.0	9.5	156	13.0	111	125	9.5
31	281		9.6		758		9.5	898		91.0		9.5
Sum	6,478.0	8,500.1	236.6	1,467.3	19,941	3,741.1	310.5	1,372.5	11,726.0	1,727.0	3,273.7	1,859.8

Month	Current Year 1971						Period 1935-1971				
	Extreme Gage Feet		Ø Extreme Second Feet			Average Second Feet	Total Acre Feet	Acre Feet			
			High	Day	Low			Average	Maximum	Minimum	
	High	Low									
Jan.			10	830	† 1	6.1	209	12,849	61,752	110,700	3,230
Feb.			6	931	28	6.8	304	16,860	54,036	89,140	2,856
Mar.			11	16	† 1	6.7	7.63	469	56,390	90,190	469
Apr.			30	925	8	9.0	48.9	2,910	56,840	86,580	2,500
May			31	758	22	531	643	39,552	64,383	88,280	5,480
June			3	922	10	8.8	125	7,420	56,370	86,960	3,330
July			† 4	12	1	7.7	10.0	616	55,806	91,220	452
Aug.			31	898	1	9.5	44.3	2,722	56,223	89,890	456
Sept.			2	895	24	12	391	23,258	56,988	83,660	12,419
Oct.			30	111	† 1	11	55.7	3,425	54,209	90,050	2,176
Nov.			29	198	†16	0	109	6,493	54,600	101,500	3,850
Dec.			9	449	†13	8.4	60.0	3,677	61,259	108,800	918
Yearly				931		0	167	120,251	688,856	1,042,850	75,950

† And other days

‡ Mean daily

## COLORADO RIVER BELOW YUMA MAIN CANAL WASTEWAY AT YUMA, ARIZONA - DISCHARGES

**DESCRIPTION:** Water-stage recorder located in California on the right bank of the river, 1,000 feet downstream from the mouth of the Yuma Main Canal Wasteway, 0.6 mile downstream from the abandoned gaging station on the Colorado River at Yuma, 5.2 miles downstream from the mouth of the Gila River, 19.6 miles downstream from Imperial Dam and 6.4 miles upstream from the northerly international boundary. Zero of gage is 101.99 feet above mean sea level, U. S. C. & G. S. datum.

**RECORDS:** Based on current meter measurements and a continuous record of gage heights. Computations by shifting control methods. Records obtained and furnished by U. S. Geological Survey. Records available: October 1963 through 1971. Records from January 1951 through September 1963, deduced from "Colorado River at Yuma" plus flows from "Reservation Main Drain No. 4", and "Yuma Main Canal Wasteway."

**REMARKS:** Reservoirs on the Colorado River, including Lake Mead where storage began in 1935, transmountain diversions, reservoirs on the Gila River, irrigation diversions and return flows modify the river flow at this station.

### Mean Daily Discharge in Second Feet 1971 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	505	708	570	995	1,120	1,460	499	634	1,350	1,710	589	633
2	520	697	530	890	1,170	1,280	603	648	1,270	879	567	627
3	510	722	524	611	1,100	1,330	880	643	1,230	681	594	640
4	505	1,090	564	583	1,120	1,270	815	657	1,230	592	580	648
5	505	1,320	646	675	1,100	495	594	675	1,230	595	628	642
6	839	1,380	641	922	1,140	513	576	710	1,220	613	617	613
7	629	1,370	637	945	1,110	499	576	725	1,210	592	617	626
8	545	1,380	633	880	1,140	482	594	750	1,230	599	602	657
9	618	1,400	645	638	1,100	486	571	730	1,250	591	588	844
10	1,500	1,440	631	655	1,080	504	562	666	1,230	588	601	795
11	1,050	1,400	649	690	1,120	490	576	639	1,210	605	557	528
12	755	1,250	629	627	1,130	466	576	657	1,110	603	574	511
13	749	520	644	574	1,120	386	576	695	932	597	601	507
14	755	510	647	585	1,110	370	634	715	962	630	650	482
15	749	585	641	598	1,110	410	666	720	936	622	545	492
16	719	515	675	602	1,090	462	648	625	565	624	588	487
17	731	495	769	683	1,100	504	670	730	534	643	645	490
18	719	476	744	713	1,080	562	670	840	506	617	595	482
19	707	495	714	746	1,050	634	661	780	505	610	636	487
20	695	505	719	836	1,020	607	634	670	526	615	623	471
21	690	668	677	687	1,080	571	643	720	533	619	636	488
22	707	783	650	719	1,050	558	630	720	501	604	629	474
23	695	719	638	675	1,040	558	630	1,470	499	588	628	475
24	695	640	668	605	1,030	562	639	845	489	595	630	471
25	701	651	682	605	1,080	504	621	770	515	615	634	456
26	701	684	684	590	1,100	470	612	995	506	586	644	460
27	707	662	693	592	1,110	482	607	815	530	586	637	446
28	713	657	839	578	1,090	478	625	567	563	614	625	448
29	679		1,010	669	1,090	446	612	535	647	589	664	459
30	701		970	1,600	1,040	495	625	607	1,830	625	662	472
31	701		978		1,110		639	1,310		619		496
Sum	21,995	23,722	21,341	21,768	33,930	18,334	19,464	23,263	26,849	20,246	18,386	16,807

Current Year 1971								Period 1951-1971			
Month	Extreme Gage Feet		Extreme Second Feet				Average Second Feet	Total Acre Feet	Acre Feet		
	High	Low	Day	High	Low	Day			Average	Maximum	Minimum
Jan.	11.28	9.72	10	1,500	† 1	505	710	43,626	244,071	979,890	29,857
Feb.	11.23	9.69	10	1,440	18	476	847	47,052	182,255	826,600	33,790
Mar.	10.59	9.74	29	1,010	3	524	688	42,329	200,820	1,073,270	35,002
Apr.	11.53	9.92	30	1,600	13	574	726	43,176	189,920	843,010	42,831
May	11.16	10.61	2	1,170	20	1,020	1,095	67,299	178,663	863,860	56,493
June	11.39	9.35	1	1,460	14	370	611	36,365	167,228	833,970	36,365
July	10.55	9.62	3	880	1	499	628	38,606	182,462	649,820	34,413
Aug.	11.85	9.64	23	1,470	29	535	750	46,141	188,428	670,050	36,426
Sept.	11.20	9.53	30	1,830	24	489	895	53,254	157,227	775,930	43,182
Oct.	11.75	9.81	1	1,710	† 26	586	653	40,157	129,871	802,210	34,965
Nov.	10.91	9.71	29	664	15	545	613	36,468	154,152	911,370	36,468
Dec.	11.13	9.58	9	844	27	446	542	33,336	198,067	1,114,550	33,023
Yearly	11.85	9.35		1,830		370	730	527,809	2,173,164	10,220,870	515,749

† And other days

‡ Mean daily

# **COLORADO RIVER BELOW YUMA MAIN CANAL WASTEWAY AT YUMA, ARIZONA - STAGES**

(See Preceding Page For Description)

**Mean Daily Gage Height in Feet 1971**

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	9.74	10.18	9.85	10.55	10.81	11.25	9.64	9.89	11.09	11.81	9.93	10.02
2	9.77	10.18	9.76	10.45	10.87	11.04	9.85	9.91	11.16	10.42	9.89	10.00
3	9.76	10.21	9.75	10.03	10.78	11.10	10.43	9.92	11.08	10.03	9.95	10.03
4	9.75	10.74	9.83	9.99	10.82	11.01	10.28	9.95	11.09	9.84	9.92	10.05
5	9.75	11.03	9.98	10.15	10.80	9.70	9.83	9.99	11.07	9.84	10.03	10.05
6	10.33	11.10	9.97	10.55	10.87	9.74	9.78	10.06	11.07	9.89	9.99	9.98
7	10.00	11.09	9.96	10.58	10.82	9.71	9.77	10.09	11.04	9.85	9.99	10.01
8	9.84	11.10	9.96	10.48	10.86	9.67	9.81	10.14	11.08	9.86	9.96	10.08
9	9.94	11.12	9.98	10.11	10.82	9.68	9.75	10.10	11.12	9.85	9.93	10.46
10	11.17	11.17	9.95	10.14	10.78	9.72	9.73	9.97	11.08	9.85	9.96	10.36
11	10.62	11.13	9.98	10.20	10.84	9.69	9.76	9.92	11.05	9.89	9.85	9.80
12	10.22	10.93	9.95	10.09	10.85	9.62	9.76	9.96	10.87	9.89	9.89	9.76
13	10.23	9.84	9.98	9.99	10.84	9.42	9.76	10.03	10.52	9.88	9.95	9.75
14	10.24	9.81	9.98	10.01	10.83	9.38	9.89	10.08	10.58	9.95	10.06	9.69
15	10.23	9.95	9.97	10.03	10.83	9.48	9.96	10.09	10.53	9.94	9.82	9.72
16	10.19	9.80	10.03	10.04	10.80	9.60	9.92	9.89	9.77	9.95	9.92	9.71
17	10.21	9.75	10.19	10.18	10.81	9.70	9.97	10.11	9.70	10.00	10.03	9.72
18	10.19	9.71	10.15	10.24	10.70	9.83	9.97	10.33	9.63	9.94	9.92	9.70
19	10.18	9.74	10.10	10.29	10.75	9.98	9.95	10.21	9.63	9.93	10.01	9.71
20	10.15	9.75	10.11	10.42	10.71	9.91	9.89	9.99	9.68	9.95	9.99	9.67
21	10.15	10.04	10.04	10.19	10.79	9.84	9.91	10.09	9.70	9.96	10.02	9.72
22	10.18	10.23	9.99	10.25	10.75	9.81	9.88	10.09	9.62	9.92	9.99	9.68
23	10.17	10.11	9.97	10.17	10.74	9.80	9.88	11.45	9.62	9.90	9.99	9.68
24	10.17	9.97	10.02	10.05	10.72	9.81	9.90	10.33	9.60	9.91	9.99	9.67
25	10.18	9.99	10.05	10.05	10.79	9.68	9.86	10.18	9.65	9.96	10.00	9.63
26	10.19	10.05	10.05	10.02	10.81	9.59	9.84	10.65	9.64	9.90	10.02	9.65
27	10.20	10.01	10.07	10.02	10.83	9.62	9.83	10.28	9.69	9.90	10.01	9.61
28	10.21	10.00	10.31	10.00	10.80	9.61	9.87	9.77	9.76	9.97	9.98	9.63
29	10.15		10.56	10.12	10.80	9.52	9.84	9.70	9.94	9.91	10.07	9.65
30	10.19		10.53	11.37	10.74	9.63	9.87	9.81	11.92	9.99	10.06	9.69
31	10.19		10.56		10.83		9.90	11.21		9.98		9.74
Avg.	10.14	10.31	10.05	10.23	10.80	9.87	9.88	10.14	10.40	10.00	9.97	9.83

## DRAIN NO. 8-B (ARAZ DRAIN)

**DESCRIPTION:** This drain discharges into the Colorado River 3.9 miles downstream from Colorado River below Yuma Main Canal Wasteway, and 2.5 miles upstream from the northerly international boundary. Prior to October 1955, published as "Araz Drain".

**RECORDS:** Records are furnished by U. S. Geological Survey from current meter measurements during the year. Records available: May 1948 through 1971.

**REMARKS:** Drain 8-B, which was constructed in February 1948, collects seepage in the westerly section of the Reservation Division of the Yuma Project which lies in California. Flow in the drain between the mouth and the U. S. Highway No. 80 culvert, about 3,200 feet upstream, is affected by backwater from the river during ordinary high stages.

**EXTREMES:** Mean daily discharge: Maximum, 24 second-feet on September 1, 1953; minimum, 0.1 second-foot several days in February 1966.

## Mean Daily Discharge in Second Feet 1971 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.9	1.3	1.5	2.5	3.0	2.0	1.3	2.0	2.9	3.5	3.9	2.5
2	1.8	1.3	1.6	2.5	2.9	2.0	1.3	2.0	2.9	3.5	3.8	2.5
3	1.8	1.3	1.6	2.5	2.9	2.0	1.3	2.1	3.0	3.6	3.8	2.5
4	1.8	1.3	1.6	2.5	2.9	2.0	1.4	2.1	3.0	3.6	3.7	2.4
5	1.8	1.3	1.7	2.5	2.8	2.0	1.4	2.2	3.0	3.6	3.7	2.4
6	1.8	1.3	1.7	2.5	2.8	1.9	1.4	2.2	3.0	3.7	3.6	2.4
7	1.7	1.3	1.7	2.5	2.7	1.9	1.4	2.2	3.0	3.7	3.6	2.4
8	1.7	1.3	1.8	2.5	2.7	1.9	1.5	2.3	3.0	3.7	3.5	2.4
9	1.7	1.3	1.8	2.5	2.7	1.9	1.5	2.3	3.0	3.8	3.5	2.3
10	1.7	1.4	1.8	2.5	2.6	1.9	1.5	2.3	3.0	3.8	3.4	2.3
11	1.7	1.4	1.9	2.5	2.6	1.9	1.5	2.4	3.1	3.9	3.4	2.3
12	1.6	1.4	1.9	2.5	2.6	1.9	1.5	2.4	3.1	3.9	3.4	2.3
13	1.6	1.4	1.9	2.5	2.5	1.8	1.6	2.4	3.1	3.9	3.3	2.2
14	1.6	1.4	2.0	2.5	2.5	1.8	1.6	2.5	3.1	3.9	3.3	2.2
15	1.6	1.4	2.0	2.5	2.4	1.8	1.6	2.5	3.1	3.9	3.2	2.2
16	1.6	1.4	2.0	2.5	2.4	1.8	1.6	2.5	3.1	3.9	3.2	2.2
17	1.5	1.4	2.1	2.5	2.4	1.8	1.7	2.6	3.2	3.9	3.1	2.1
18	1.5	1.4	2.1	2.6	2.3	1.8	1.7	2.6	3.2	3.9	3.1	2.1
19	1.5	1.4	2.1	2.7	2.3	1.8	1.7	2.6	3.2	3.9	3.0	2.1
20	1.5	1.4	2.2	2.8	2.3	1.8	1.7	2.7	3.2	3.9	3.0	2.1
21	1.5	1.5	2.2	2.8	2.2	1.8	1.8	2.7	3.2	3.9	2.9	2.1
22	1.4	1.5	2.3	2.9	2.2	1.8	1.8	2.7	3.2	3.9	2.9	2.1
23	1.4	1.5	2.3	3.0	2.1	1.8	1.8	2.8	3.2	3.9	2.8	2.1
24	1.4	1.5	2.3	3.0	2.1	1.8	1.8	2.8	3.2	3.9	2.8	2.1
25	1.4	1.5	2.4	3.0	2.1	1.7	1.8	2.8	3.3	3.9	2.7	2.1
26	1.4	1.5	2.4	3.0	2.0	1.6	1.9	2.8	3.3	3.9	2.7	2.1
27	1.3	1.5	2.4	3.0	2.0	1.5	1.9	2.8	3.3	3.9	2.6	2.1
28	1.3	1.5	2.5	3.0	2.0	1.4	1.9	2.8	3.3	3.9	2.6	2.1
29	1.3		2.5	3.0	2.0	1.3	1.9	2.8	3.3	3.9	2.6	2.1
30	1.3		2.5	3.0	2.0	1.3	1.9	2.8	3.3	3.9	2.5	2.1
31	1.3		2.5		2.0		1.9	2.8		3.9		2.1
Sum	48.4	39.1	63.3	80.3	75.0	53.7	50.6	77.5	93.8	118.4	95.6	69.0
Current Year 1971												
Month	Extreme Gage Feet		β Extreme Second Feet				Average Second Feet	Total Acre Feet	Period 1948-1971			
	High	Low	Day	High	Low	Day			Average	Maximum	Minimum	
Jan.			1	1.9	1.3	1.6	96.0	381	899	39.3		
Feb.			†21	1.5	1.3	1.4	77.6	331	746	40.5		
Mar.			†28	2.5	1.5	2.0	126	404	853	73.8		
Apr.			†23	3.0	1.5	2.7	159	428	1,000	66.8		
May			1	3.0	2.0	2.4	149	426	966	61.5		
June			†1	2.0	1.3	1.8	107	445	1,030	67.4		
July			†26	1.9	1.3	1.6	100	506	1,260	72.8		
Aug.			†23	2.8	1.3	2.5	154	561	1,350	73.8		
Sept.			†25	3.3	1.3	3.1	186	533	1,370	53.6		
Oct.			†11	3.9	1.5	3.7	235	543	1,220	55.3		
Nov.			1	3.9	2.5	3.2	190	489	1,240	57.7		
Dec.			†1	2.5	2.1	2.2	137	445	1,050	51.0		
Yearly				3.9	1.3	2.3	1,716.6	5,492	12,429	834		

β Mean daily

† And other days

## PILOT KNOB POWER PLANT AND WASTEWAY NEAR PILOT KNOB, CALIFORNIA

**DESCRIPTION:** The Pilot Knob Power Plant and Wasteway is located on the All-American Canal, 20.8 miles downstream from the intake at Imperial Dam, 6 miles west of Yuma, about one mile north of the northerly international boundary and empties into the old Alamo Canal in the United States and thence into the Colorado River through Rockwood gates, about one mile upstream from the northerly international boundary. Water-stage recorder is located in forebay on right bank of the All-American Canal, 550 feet upstream from wasteway gates and 1,800 feet from entrance to the power plant. Datum of gage is 150.00 feet above mean sea level. Tailrace gage is on left bank, 680 feet downstream from power plant with automatic recording equipment in control house. All bypass gates are equipped with calibrated openings which are read on all gate changes. Datum of tailrace gage is at mean sea level; elevation of sill of wasteway gates is 147.88 feet, U. S. C. & G. S. datum. Prior to October 1956, this station was published as "Pilot Knob Wasteway near Pilot Knob, California."

**RECORDS:** Daily discharge is computed from flowmeter equipment and head and openings on wasteway gates or from head and gate opening on wicket and wasteway gates. Records furnished by the U. S. Geological Survey. Records available: July 1944 through 1971. The wasteway was operated for the purpose of diverting Colorado River water to the Alamo Canal for use in Mexico from July 1944 to November 8, 1950, in accordance with arrangements between the United States and Mexico for emergency use of the All-American Canal facilities. Records since 1950 show water released through Pilot Knob Power Plant and Wasteway from the All-American Canal and returned to the Colorado River through Rockwood gates.

**REMARKS:** Pilot Knob Wasteway was completed in 1938 and the first flow occurred on February 5, 1939. Pilot Knob Power Plant was completed in January 1957 and the first flow occurred on January 14, 1957.

**EXTREMES:** Maximum mean daily discharge, 8,350 second-feet on January 26, 1958; minimum mean daily discharge, no flow during long periods.

### Mean Daily Discharge in Second Feet 1971 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,300	0	1,440	2,350	0	0	1,840	1,910	0	0	0	0
2	1,070	0	1,810	2,350	0	0	1,800	1,940	0	0	0	0
3	1,080	0	2,090	2,350	0	0	1,460	1,950	0	0	0	0
4	1,350	0	2,120	2,350	0	0	1,520	2,000	0	0	0	0
5	1,670	0	2,010	2,400	0	1,090	1,750	1,940	0	0	0	0
6	1,360	0	2,040	2,370	0	1,030	1,800	1,870	0	0	0	0
7	1,280	0	2,010	2,380	0	1,000	1,800	1,830	0	0	0	0
8	1,330	0	2,040	2,360	0	1,020	1,780	1,840	0	0	0	0
9	1,100	0	2,020	2,340	0	1,040	1,800	1,880	0	0	0	0
10	0	0	2,030	2,310	0	1,040	1,800	1,930	0	0	0	483
11	0	0	2,030	2,260	0	1,040	1,800	1,870	0	0	0	1,040
12	0	36	2,050	2,320	0	1,000	2,030	1,830	0	0	0	1,380
13	0	1,030	2,020	2,360	0	1,050	2,080	1,830	0	0	0	1,470
14	0	1,010	1,960	2,380	0	1,100	2,060	1,820	0	0	0	1,480
15	0	961	2,310	2,390	0	1,030	2,000	1,780	0	0	0	1,480
16	0	1,080	2,330	2,110	0	1,260	2,040	1,850	0	0	0	1,490
17	0	1,150	2,200	1,910	0	1,270	2,080	1,760	0	0	0	1,450
18	0	1,150	2,260	1,850	0	1,270	2,110	1,620	0	0	0	1,430
19	0	1,130	2,260	1,800	0	1,440	2,080	1,600	0	0	0	1,420
20	0	1,090	2,270	1,730	0	1,450	2,070	1,620	0	0	0	1,450
21	0	1,180	2,260	1,890	0	1,680	2,070	1,840	0	0	0	1,460
22	0	1,200	2,310	1,720	0	1,680	2,080	1,780	0	0	0	1,460
23	0	1,140	2,320	1,500	0	1,720	2,130	1,170	0	0	0	1,450
24	0	1,080	2,330	1,540	0	1,710	2,100	1,520	0	0	0	1,470
25	0	1,040	2,320	1,500	0	1,810	2,100	1,740	0	0	0	1,470
26	0	1,000	2,320	1,580	0	1,860	2,130	1,480	0	0	0	1,480
27	0	1,060	2,290	1,620	0	1,840	2,140	1,590	0	0	0	1,490
28	0	1,110	2,290	1,340	0	1,790	2,140	1,590	0	0	0	1,510
29	0		2,270	1,130	0	1,840	2,160	1,290	0	0	0	1,480
30	0		2,330	0	0	1,800	2,170	1,070	104	0	0	1,480
31	0		2,290		0		2,140	0		0		1,640
Sum	11,540	17,447	66,630	58,500	0	35,860	61,060	51,990	104	0	0	30,963

Current Year 1971								Period 1944-1971		
Month	Extreme Gage Feet		Extreme Second Feet			Average Second Feet	Total Acre Feet	Acre Feet		
	High	Low	Day	High	Low			Average	Maximum	Minimum
Jan.			5	1,670	† 10	0	372	43,291	400,200	0
Feb.			22	1,200	† 1	0	623	18,876	149,500	0
Mar.			† 16	2,330	1	1,440	2,149	68,007	279,300	0
Apr.			5	2,400	30	0	1,950	95,162	260,900	0
May				0	0	0	0	19,794	165,400	0
June			26	1,860	† 1	0	1,195	71,127	204,300	0
July			30	2,170	3	1,460	1,970	121,111	260,000	0
Aug.			4	2,000	31	0	1,677	103,121	270,100	0
Sept.			30	104	† 1	0	3.5	56,012	173,300	0
Oct.				0	0	0	0	11,287	51,460	0
Nov.				0	0	0	0	15,862	182,600	0
Dec.			31	1,640	† 1	0	999	61,414	319,700	0
Yearly				2,400		0	912	662,666	1,944,700	0

‡ Mean daily † And other days

## WELLTON-MOHAWK DRAINAGE WATER DISCHARGED TO COLORADO RIVER ABOVE MORELOS DAM

**DESCRIPTION:** Diversion structure (Main Outlet Drain Extension No. 1) in Wellton-Mohawk Drainage Extension Channel for diverting water to the Gila River, 0.5 mile upstream from the confluence of the Gila and Colorado Rivers. A continuous water-stage recorder immediately upstream from outlet structure (Main Outlet Drain Extension No. 2), 0.4 mile downstream from diversion structure which diverts water from the Extension Channel directly to the Colorado River at a point 0.8 mile upstream from the northerly international boundary, and 1.9 miles upstream from Morelos Dam. The Gila River enters the Colorado River 13 miles upstream from Morelos Dam.

**RECORDS:** Partial diversions of the Extension Channel flow at M. O. D. E. No. 1 were determined from the gate openings, rated by discharge measurements below the outlet. Diversions of the total Extension Channel flow were determined at an upstream measuring station at channel station 9400. Flows diverted at M. O. D. E. No. 2 were based on discharge measurements during the year and a continuous record of gage heights. Records furnished by Bureau of Reclamation through September 30, 1969. Beginning October 1, 1969 records furnished by U. S. Geological Survey. The record shown below is the combination of diversions at M. O. D. E. No. 1 and M. O. D. E. No. 2. Records available: February 10, 1961 through 1971.

**REMARKS:** Pursuant to Minute No. 218 of the Commission, an extension to the Wellton-Mohawk Drainage Conveyance Channel was constructed along the left bank of the Colorado River to a point immediately below Morelos Dam, a distance of about 12 miles, and placed in operation on November 16, 1965. Drainage flows may be discharged to the Gila River and thence to the Colorado River at the diversion structure, M. O. D. E. No. 1, at the upstream end of the extension; and directly to the Colorado River at the structure above Morelos Dam, M. O. D. E. No. 2, and at the structure immediately below Morelos Dam, M. O. D. E. No. 3, the record of which is shown on page 22.

### Mean Daily Discharge in Second Feet 1971 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	154	0	287	300	130	174	298	303	182	0	0	0
2	141	0	293	268	122	176	296	296	172	0	0	0
3	139	0	294	292	118	173	298	300	171	0	0	0
4	160	69.0	286	285	117	170	303	296	175	0	0	0
5	176	104	300	310	124	195	298	297	179	0	0	0
6	180	106	300	283	127	197	295	292	178	0	0	0
7	168	105	301	285	127	200	288	291	179	0	0	0
8	158	108	300	259	125	201	281	290	175	0	0	0
9	133	108	299	254	125	198	293	289	169	0	0	35.0
10	99.0	109	299	282	125	197	307	286	172	0	0	78.0
11	62.0	120	298	289	126	197	303	300	173	0	0	76.0
12	1.6	130	296	292	124	197	300	297	157	0	0	108
13	.1	155	298	291	124	196	156	298	129	0	0	158
14	0	158	304	290	125	196	152	303	126	0	0	171
15	0	158	300	286	123	200	155	299	129	0	0	188
16	0	164	301	284	124	255	151	296	5.2	0	0	196
17	0	173	299	282	124	246	150	298	0	0	0	204
18	0	211	301	285	122	246	148	290	0	0	0	212
19	0	219	302	283	127	284	205	163	0	0	0	205
20	0	239	300	288	126	288	255	150	0	0	0	199
21	0	319	304	281	126	184	257	155	0	0	0	198
22	0	264	301	287	125	302	257	152	0	0	0	196
23	0	204	300	292	126	296	257	31.0	0	0	0	196
24	0	259	297	296	127	296	247	0	0	0	0	198
25	0	254	295	295	125	302	262	0	0	0	0	195
26	0	257	291	292	126	303	258	0	0	0	0	195
27	0	254	303	279	127	302	260	0	0	0	0	184
28	0	266	361	258	126	302	293	0	0	0	0	173
29	0		313	227	123	302	302	0	0	0	0	173
30	0		304	176	125	307	302	169	0	0	0	174
31	0		311		126		301	170	0	0	0	179
Sum	1,571.7	4,513.0	9,348	8,371	3,867	7,082	7,928	6,292.0	2,471.2	0	0	3,891.0

Current Year 1971								Period 1961-1971			
Month	Extreme Gage Feet		Extreme Second Feet			Average Second Feet	Total	Acre Feet			
	High	Low	Day	High	Day	Low	Second Feet	Acre Feet	Average	Maximum	Minimum
Jan.			6	180	†14	0	50.7	3,117	8,019	19,452	0
Feb.			21	319	† 1	0	162	8,951	7,814	16,784	0
Mar.			28	361	1	287	302	18,541	15,155	18,742	8,434
Apr.			5	310	30	176	279	16,604	15,574	18,573	11,948
May			1	130	4	117	125	7,670	12,277	19,783	5,944
June			30	307	4	170	236	14,047	14,252	19,186	9,523
July			10	307	18	148	256	15,725	16,919	19,295	15,062
Aug.			† 1	303	†24	0	203	12,480	16,230	18,887	12,480
Sept.			1	182	†17	0	82.4	4,902	10,799	18,313	3,052
Oct.				0		0	0	0	6,460	18,625	0
Nov.				0		0	0	0	6,177	17,627	0
Dec.			18	212	† 1	0	126	7,718	7,440	18,988	930
Yearly				361		0	155	109,755	137,116	215,087	86,306

† And other days

ø Mean daily

## COLORADO RIVER AT NORTHERLY INTERNATIONAL BOUNDARY - DISCHARGES

**DESCRIPTION:** Water-stage recorder on the left (Arizona) bank and cableway at the point where the northerly international land boundary (California-Baja California) intersects the Colorado River, about 6.4 miles downstream from Colorado River below Yuma Main Canal Wasteway, 5 miles west of Yuma, Arizona, 1.1 miles upstream from Morelos Diversion Structure, and about one mile downstream from Rockwood Gate. Zero of the gage is at mean sea level, U. S. C. & G. S. datum. Station is operated by the United States Section of the Commission.

**RECORDS:** Based on 359 current meter measurements during the year, 205 by the United States Section, 144 by the Mexican Section of the Commission, 10 by the U. S. Geological Survey, and a continuous record of gage heights. Computations by shifting control methods. Discharges are computed on the basis of a water-stage recorder located 1,660 feet upstream from the northerly international boundary where the remains of an old weir serve as a partial controlling section. A continuous gage height record is available November 15, 1948 through 1971; daily discharge records available January 1, 1950 through 1971.

**REMARKS:** Reservoirs on the Colorado River, including Lake Mead above Hoover Dam, where storage began in 1935, reservoirs on the Gila River, and many irrigation diversions and return flows regulate the river flow at this station except for infrequent flood flows. During 1971, the flow at this point represented the total amount of Colorado River water which crossed the northerly international boundary.

**EXTREMES:** Prior to January 1935: Maximum instantaneous discharge estimated about 250,000 second-feet, January 22, 1916; minimum discharge, no flow several days during August and September 1934; average annual flow 13,443,000 acre-feet; maximum annual flow 25,480,000 acre-feet, 1907; minimum annual flow 1,174,000 acre-feet, 1934. Since January 1935: Maximum mean daily discharge, about 33,000 second-feet, February 7, 1942; minimum discharge, no flow during April 1935.

### Mean Daily Discharge in Second Feet 1971 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2,030	740	2,320	3,320	1,200	1,500	2,660	2,880	1,500	1,970	700	710
2	1,760	720	2,620	3,340	1,180	1,460	2,660	2,900	1,520	1,250	681	700
3	1,740	700	2,890	3,320	1,140	1,440	2,650	2,920	1,500	782	700	710
4	2,030	1,080	2,960	3,300	1,140	1,480	2,670	2,980	1,490	662	690	728
5	2,370	1,340	2,960	3,310	1,140	1,760	2,640	2,950	1,500	624	728	728
6	2,370	1,380	2,980	3,320	1,190	1,710	2,660	2,900	1,500	662	710	690
7	2,130	1,400	2,960	3,360	1,190	1,710	2,680	2,890	1,490	634	710	681
8	2,070	1,410	2,960	3,340	1,200	1,730	2,670	2,920	1,500	652	710	719
9	1,830	1,410	2,950	3,310	1,180	1,730	2,660	2,940	1,520	652	690	962
10	1,470	1,440	2,960	3,340	1,160	1,740	2,670	2,900	1,500	643	700	1,440
11	1,100	1,470	2,960	3,340	1,160	1,740	2,670	2,820	1,500	662	664	1,690
12	728	1,430	2,960	3,320	1,180	1,770	2,950	2,800	1,400	662	662	2,030
13	710	1,740	2,980	3,320	1,170	1,730	2,890	2,840	1,170	662	672	2,170
14	750	1,730	2,920	3,340	1,170	1,750	2,920	2,840	1,180	690	752	2,180
15	740	1,730	3,250	3,340	1,170	1,730	2,920	2,840	1,190	690	634	2,210
16	730	1,770	3,280	3,090	1,170	2,060	2,920	2,800	690	700	643	2,210
17	740	1,840	3,260	2,880	1,180	2,110	2,920	2,800	618	719	719	2,190
18	730	1,880	3,280	2,890	1,180	2,110	2,940	2,760	567	710	681	2,180
19	730	1,880	3,280	2,860	1,140	2,380	2,950	2,640	567	700	700	2,180
20	700	1,880	3,300	2,840	1,130	2,390	2,960	2,700	596	700	690	2,190
21	710	1,980	3,260	2,860	1,170	2,450	2,960	2,740	605	710	710	2,210
22	720	2,000	3,260	2,740	1,170	2,540	2,960	2,710	576	710	690	2,190
23	730	2,040	3,260	2,520	1,170	2,570	3,010	2,590	576	681	690	2,210
24	730	2,020	3,280	2,480	1,180	2,590	2,980	2,510	567	672	690	2,220
25	730	2,000	3,300	2,480	1,190	2,610	2,960	2,470	573	710	681	2,190
26	730	1,990	3,310	2,500	1,190	2,610	3,010	2,490	576	690	710	2,220
27	730	2,000	3,300	2,520	1,200	2,610	3,010	2,470	586	690	710	2,180
28	* 740	2,060	3,280	2,220	1,200	2,590	3,060	2,210	643	700	690	2,210
29	720		3,280	1,940	1,220	2,590	3,060	1,880	732	681	719	2,210
30	720		3,280	1,570	1,180	2,610	3,080	1,810	1,600	719	748	2,190
31	740		3,250		1,190		3,070	1,510		719		2,360
Sum	35,458	45,060	96,090	88,310	36,430	61,800	88,820	82,410	31,532	23,108	20,874	53,688
	35,458	45,060	96,090	88,310	36,430	61,800	88,820	82,410	31,532	23,108	20,874	53,688
	Current Year 1971											
Month	Extreme Gage Feet		Extreme Second Feet				Average Second Feet	Total Acre Feet	Period 1935-1971			
	High	Low	Day	High	Low	Day			Average	Maximum	Minimum	
Jan.	103.84	102.12	6	2,470	12	690	1,140	70,330	443,775	1,644,000	31,900	
Feb.	103.84	102.05	123	2,100	3	640	1,610	89,375	370,323	1,378,000	60,400	
Mar.	104.51	103.52	116	3,380	1	2,040	3,100	190,592	368,598	1,120,000	19,400	
Apr.	104.55	102.96	10	3,430	30	1,420	2,940	175,160	286,150	823,850	0	
May	103.05	102.64	1	1,500	20	1,080	1,180	72,858	294,355	1,151,000	72,258	
June	104.04	102.76	30	2,730	5	1,220	2,060	122,579	276,720	1,175,000	8,500	
July	104.32	103.90	128	3,120	4	2,570	2,870	176,172	266,967	763,800	24,400	
Aug.	104.25	102.87	1	3,040	31	1,360	2,660	163,458	283,758	791,600	43,800	
Sept.	107.05	101.82	30	2,080	25	520	1,050	62,543	257,144	1,029,000	60,000	
Oct.	107.05	101.99	1	2,070	4	624	745	45,834	260,538	1,186,000	42,956	
Nov.	102.36	101.91	14	990	15	596	696	41,403	328,068	1,422,000	41,403	
Dec.	103.85	102.01	31	2,420	7	652	1,730	106,489	422,434	1,832,000	42,000	
Yearly	107.05	101.82		3,430		520	1,815	1,316,193	3,858,830	10,596,900	722,100	

\* Partly estimated

‡ Estimated

† And other days



## COLORADO RIVER AT NORTHERLY INTERNATIONAL BOUNDARY - STAGES

(See Preceding Page for Description)

Mean Daily Gage Height in Feet 1971

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	103.50	102.17	103.72	104.45	102.74	103.05	103.97	*104.18	*102.98	106.60	102.04	102.04
2	103.28	102.16	103.95	104.47	102.71	103.02	103.98	*104.18	*103.01	104.27	102.02	102.05
3	103.27	102.14	104.14	104.44	102.68	103.01	103.97	*104.16	102.99	102.21	102.05	102.06
4	103.51	102.69	104.19	104.42	102.69	103.04	103.98	*104.20	102.98	102.02	102.05	102.07
5	103.77	103.10	104.18	104.44	102.70	103.29	103.97	*104.18	102.99	102.00	102.10	102.08
6	103.78	102.88	104.18	104.48	102.74	103.26	103.97	*104.15	102.99	102.04	102.08	102.06
7	103.59	102.91	104.18	104.50	102.75	103.25	103.99	*104.14	102.96	102.00	102.07	102.05
8	103.55	102.94	104.19	104.49	102.75	103.26	103.98	*104.16	102.99	102.03	102.07	102.10
9	103.35	102.93	104.19	104.46	102.73	103.26	103.98	*104.17	103.00	102.03	102.04	102.36
10	103.00	103.00	104.20	104.49	102.69	103.28	103.98	104.16	103.00	102.01	102.05	102.85
11	102.63	103.01	104.20	104.48	102.69	103.27	103.99	104.10	102.99	102.03	102.01	103.16
12	102.20	103.00	104.20	104.48	102.71	103.22	104.21	104.09	102.88	102.03	102.00	103.47
13	102.17	103.30	104.21	104.48	102.71	103.18	104.17	104.11	102.65	102.04	102.01	103.60
14	102.21	103.28	104.16	104.48	102.70	103.19	104.18	104.11	102.65	102.07	102.10	103.61
15	102.20	103.28	104.40	104.49	102.70	103.20	104.17	104.11	102.67	102.07	101.95	103.65
16	102.19	103.31	104.43	104.30	102.71	103.46	104.18	104.08	*101.11	102.09	101.97	103.65
17	102.20	103.36	104.43	104.15	102.71	103.51	104.18	104.09	*101.99	102.10	102.07	103.65
18	102.18	103.39	104.42	104.15	102.73	103.52	104.18	104.06	*101.89	102.08	102.01	103.65
19	102.17	103.40	104.42	104.12	102.69	103.75	104.20	103.95	*101.92	102.07	102.03	103.65
20	102.14	103.39	104.44	104.11	102.69	103.75	104.22	103.98	*101.95	102.08	102.02	103.65
21	102.15	103.47	104.42	104.12	102.73	103.80	104.21	103.99	*101.97	102.08	102.06	103.66
22	102.15	103.50	104.42	104.04	102.74	103.88	104.22	103.93	*101.93	102.07	102.04	103.67
23	102.16	103.51	104.43	103.86	102.72	103.91	104.24	103.86	*101.93	102.03	102.04	103.67
24	102.17	103.50	104.44	103.84	102.71	103.91	104.22	103.80	101.90	102.04	102.04	103.67
25	102.15	103.49	104.46	103.85	102.73	103.93	104.22	103.76	101.90	102.07	102.03	103.65
26	102.15	103.48	104.46	103.85	102.73	103.94	104.24	103.76	101.91	102.04	102.06	103.67
27	102.15	103.50	104.45	103.87	102.74	103.93	104.23	103.77	101.88	102.04	102.06	103.65
28	*102.20	103.55	104.43	103.66	102.75	103.91	104.28	103.60	101.97	102.06	102.04	103.67
29	*102.18		104.41	103.44	102.76	103.91	104.28	103.33	102.07	102.02	102.07	103.67
30	*102.19		104.42	103.09	102.74	103.95	104.30	103.24	104.66	102.07	102.10	103.66
31	*102.20		104.39		102.74		104.30	103.01		102.08		103.79
Avg.	102.60	103.13	104.30	104.18	102.72	103.49	104.14	103.95	102.52	102.27	102.04	103.16

\* Partly Estimated

" Estimated

## COLORADO RIVER IMMEDIATELY ABOVE MORELOS DAM - STAGES

**DESCRIPTION:** Water-stage recorder located on the right bank of the Colorado River in Mexico attached to the upstream abutment of the gates of the Intake Canal at Morelos Dam, 1.1 miles downstream from the northerly international boundary, and about 7.5 miles downstream from the Colorado River below Yuma Main Canal Wasteway. Since April 17, 1969, zero of the gage is at mean sea level, U. S. C. & G. S. datum; prior to that date zero of the gage was 0.16 foot below mean sea level.

**RECORDS:** Records obtained and furnished by the Mexican Section of the Commission. Records available: Staff gage height records November 8, 1950 to June 3, 1951; a continuous record of gage heights June 4, 1951 through 1971.

**REMARKS:** Prior to June 4, 1951, when a continuous water-stage recorder was installed, mean daily gage height records were determined from hourly readings of a staff gage.

**EXTREMES:** Since November 8, 1950: Maximum mean daily elevation above mean sea level, 112.70 on January 2, 1958; minimum mean daily elevation above mean sea level, 101.51 on February 17, 1957.

Mean Daily Gage Height in Feet 1971

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	102.85	101.90	103.02	103.58	102.30	102.53	103.22	103.31	102.49	106.56	101.84	101.90
2	102.72	101.90	103.18	103.58	102.26	102.49	103.22	103.35	102.49	104.20	101.84	101.90
3	102.69	101.87	103.35	103.58	102.23	102.49	103.22	103.35	102.46	102.00	101.84	101.90
4	102.85	102.36	103.41	103.58	102.23	102.49	103.22	103.38	102.46	101.80	101.84	101.94
5	103.05	102.79	103.41	103.58	102.23	102.66	103.22	103.35	102.46	101.77	101.90	101.94
6	103.08	102.43	103.41	103.61	102.26	102.66	103.22	103.35	102.49	101.80	101.87	101.90
7	102.95	102.43	103.38	103.61	102.26	102.66	103.22	103.31	102.49	101.77	101.87	101.90
8	102.89	102.43	103.41	103.61	102.26	102.66	103.22	103.31	102.49	101.80	101.87	101.94
9	102.72	102.43	103.41	103.58	102.23	102.66	103.22	103.35	102.49	101.80	101.84	102.10
10	102.49	102.46	103.44	103.61	102.23	102.66	103.25	103.35	102.49	101.77	101.87	102.46
11	102.20	102.49	103.44	103.58	102.23	102.66	103.25	103.28	102.46	101.80	101.84	102.62
12	101.90	102.49	103.44	103.54	102.26	102.62	103.38	103.28	102.40	101.80	101.84	102.89
13	101.87	102.66	103.44	103.58	102.26	102.62	103.35	103.28	102.23	101.80	101.84	102.99
14	101.90	102.66	103.41	103.58	102.26	102.59	103.35	103.28	102.23	101.84	101.90	102.99
15	101.90	102.69	103.58	103.58	102.26	102.59	103.35	103.28	102.23	101.84	101.80	103.02
16	101.90	102.72	103.61	103.44	102.26	102.79	103.35	103.28	101.80	101.84	101.84	103.02
17	101.90	102.76	103.61	103.35	102.26	102.85	103.35	103.28	101.74	101.87	101.90	102.99
18	101.90	102.76	103.58	103.35	102.30	102.85	103.35	103.28	101.71	101.84	101.84	102.99
19	101.87	102.76	103.61	103.31	102.26	103.02	103.38	103.22	101.71	101.84	101.87	102.99
20	101.87	102.76	103.61	103.31	102.26	103.02	103.38	103.22	101.71	101.84	101.87	102.99
21	101.87	102.82	103.58	103.31	102.30	103.08	103.38	103.15	101.71	101.84	101.87	102.99
22	101.87	102.82	103.61	103.25	102.30	103.15	103.38	103.05	101.71	101.84	101.90	103.02
23	101.87	102.85	103.64	103.12	102.30	103.15	103.41	103.05	101.71	101.80	101.90	103.02
24	101.87	102.82	103.61	103.08	102.26	103.18	103.38	103.02	101.71	101.84	101.90	103.02
25	101.87	102.82	103.61	103.08	102.30	103.18	103.38	102.95	101.71	101.84	101.90	102.99
26	101.87	102.82	103.61	103.08	102.30	103.22	103.38	102.92	101.71	101.84	101.90	103.02
27	101.87	102.82	103.61	103.08	102.30	103.22	103.41	102.95	101.71	101.84	101.90	102.99
28	101.90	102.85	103.54	102.95	102.30	103.18	103.41	102.95	101.77	101.84	101.90	102.99
29	101.87		103.54	102.79	102.30	103.18	103.44	102.72	101.87	101.84	101.90	102.99
30	101.90		103.58	102.56	102.30	103.22	103.44	102.66	104.66	101.87	101.97	102.95
31	101.90		103.54		102.30		103.44	102.49		101.87		103.08
Avg.	102.20	102.59	103.48	103.35	102.26	102.85	103.31	103.15	102.17	102.07	101.87	102.66

## INTAKE CANAL AT MORELOS DIVERSION STRUCTURE - DISCHARGES

**DESCRIPTION:** Water-stage recorder and staff gage on left bank of Intake Canal, 200 feet downstream from the intake at Morelos Dam, 1,350 feet upstream from the point where it joins the old Alamo Canal, 2.2 miles upstream from Matamoros Check, and about one mile south of the northerly international boundary. Zero of gage is 0.16 foot below mean sea level, U. S. C. & G. S. datum.

**RECORDS:** The records are deduced from the flows arriving in the limitrophe section of the Colorado River at the northerly international boundary, the flows that pass downstream from the structure, and leakage through the structure. Records available: November 8, 1950 through 1971. Records obtained and furnished by the Mexican Section of the Commission.

**REMARKS:** The canal is operated with a minimum hydraulic slope to permit the maximum retention of silt above Matamoros Check and the lower velocities in the canal do not permit measuring the flow with a current meter. Records for this station show the amounts of Colorado River water diverted at Morelos Diversion Dam to the Intake Canal and thence to the Alamo Canal for use in Mexico. Water for use in Mexico may also be diverted to the Alamo Canal in the United States directly from the river at Rockwood Heading or by means of Imperial Dam, the All-American Canal, and certain facilities of the Imperial Irrigation District under conditions set forth in the 1944 Water Treaty. No diversions of the above nature have been made during the years 1951 through 1971 and consequently the records reported below show the total water diverted from the Colorado River to the Alamo Canal during those years. Other diversions from the Colorado River are made by Mexico downstream from Morelos Dam by means of pumps.

**EXTREMES:** Maximum mean daily discharge, 6,540 second-feet, August 3, 1958; maximum mean daily gage height, 107.22 feet November 8, 1950. Minimum daily discharge, no flow on various occasions.

## Mean Daily Discharge in Second Feet 1971 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2,030	735	2,310	3,310	1,200	1,490	2,650	2,870	1,500	650	696	706
2	1,760	713	2,610	3,330	1,180	1,450	2,650	2,890	1,520	607	678	696
3	1,740	692	2,880	3,310	1,140	1,430	2,640	2,910	1,490	731	699	706
4	2,020	1,060	2,950	3,290	1,130	1,470	2,660	2,970	1,490	636	689	727
5	2,360	1,320	2,950	3,300	1,130	1,750	2,630	2,940	1,500	611	724	724
6	2,360	1,370	2,970	3,310	1,180	1,710	2,650	2,890	1,500	646	706	685
7	2,130	1,390	2,950	3,350	1,180	1,700	2,670	2,880	1,490	622	706	678
8	2,070	1,410	2,950	3,330	1,200	1,720	2,670	2,910	1,490	646	706	717
9	1,830	1,410	2,940	3,300	1,180	1,720	2,650	2,930	1,510	643	682	953
10	1,470	1,430	2,950	3,330	1,160	1,730	2,660	2,890	1,490	636	696	1,430
11	1,100	1,460	2,950	3,330	1,160	1,730	2,660	2,810	1,490	657	660	1,680
12	724	1,430	2,950	3,310	1,180	1,760	2,940	2,790	1,400	653	660	2,020
13	706	1,730	2,970	3,310	1,170	1,720	2,890	2,830	1,170	557	671	2,160
14	749	1,730	2,910	3,330	1,170	1,740	2,920	2,830	1,180	689	749	2,170
15	738	1,730	3,240	3,330	1,170	1,720	2,920	2,830	1,190	685	629	2,210
16	727	1,760	3,270	3,030	1,170	2,050	2,920	2,790	689	696	639	2,200
17	738	1,830	3,250	2,870	1,180	2,100	2,920	2,790	611	713	717	2,180
18	727	1,870	3,270	2,880	1,170	2,100	2,940	2,750	558	703	678	2,170
19	727	1,870	3,270	2,850	1,130	2,370	2,940	2,640	565	692	713	2,180
20	696	1,870	3,290	2,830	1,120	2,380	2,950	2,690	590	696	689	2,190
21	706	1,970	3,260	2,850	1,160	2,440	2,950	2,630	597	706	706	2,210
22	717	1,990	3,260	2,730	1,160	2,530	2,950	2,400	569	706	685	2,190
23	727	2,030	3,250	2,510	1,160	2,560	3,000	2,380	590	685	685	2,210
24	727	2,010	3,270	2,470	1,170	2,580	2,970	2,320	565	671	689	2,220
25	727	2,000	3,290	2,470	1,180	2,600	2,950	2,230	565	706	678	2,190
26	727	1,980	3,300	2,490	1,180	2,600	3,010	2,200	565	689	706	2,220
27	724	2,000	3,290	2,510	1,200	2,600	3,000	2,250	579	689	710	2,180
28	735	2,060	3,270	2,210	1,190	2,580	3,050	1,920	636	696	689	2,210
29	713		3,270	1,940	1,210	2,580	3,050	1,720	682	678	717	2,210
30	713		3,270	1,570	1,170	2,600	3,070	1,780	848	717	745	2,190
31	735		3,240		1,190		3,070	1,500		717		2,360
Sum	35,336	44,860	95,837	88,078	36,254	61,553	88,612	80,171	30,583	20,927	20,797	53,548
Current Year 1971												
Month	Extreme Gage Feet		Extreme Second Feet				Average Second Feet	Total Acre Feet	Period 1950-1971			
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum	
Jan.	102.36	99.84	† 6	2,360	20	696	1,141	70,088	60,769	116,737		966
Feb.	103.58	100.75	28	2,060	3	692	1,603	88,979	56,594	101,685		9,232
Mar.	103.15	101.41	26	3,300	1	2,310	3,090	190,089	167,757	216,994		97,902
Apr.	102.99	101.54	7	3,350	30	1,570	2,935	174,700	196,061	264,127		158,162
May	101.64	101.31	29	1,210	20	1,123	1,169	71,903	95,474	159,010		66,207
June	102.20	101.41	† 25	2,600	3	1,430	2,052	122,089	165,439	269,632		102,000
July	102.07	101.77	† 30	3,070	5	2,630	2,857	175,758	234,746	304,263		154,478
Aug.	102.03	100.89	4	2,970	31	1,500	2,585	159,017	233,634	341,044		153,925
Sept.	102.38	99.74	2	1,580	18	558	1,021	60,659	132,317	198,095		53,633
Oct.	100.10	99.80	3	731	2	607	675	41,509	48,572	90,639		10,453
Nov.	100.10	99.74	14	749	15	629	692	41,250	36,605	103,954		7,516
Dec.	101.28	99.64	31	2,360	7	678	1,727	106,211	131,440			8,825
Yearly	103.58	99.64		3,350		558	1,794	1,302,254	1,491,763	1,961,556		1,290,627

β Mean daily

† And other days

# INTAKE CANAL AT MORELOS DIVERSION STRUCTURE - STAGES

(See Preceding Page for Description)

Mean Daily Gage Height in Feet 1971

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	101.80	101.15	101.90	102.82	101.48	101.80	101.87	101.90	101.05	99.97	99.90	99.97
2	101.64	101.12	102.53	102.82	101.48	101.80	101.87	101.94	101.18	99.93	99.87	99.93
3	101.61	101.12	102.69	102.85	101.44	101.84	101.87	101.90	101.18	99.97	99.93	99.93
4	101.77	102.07	102.82	102.89	101.48	101.84	101.87	101.94	101.08	99.90	99.93	99.93
5	102.13	102.20	102.76	102.85	101.44	101.90	101.84	101.94	101.05	99.90	99.97	99.97
6	102.10	101.15	102.79	102.92	101.48	101.90	101.84	101.90	101.02	99.97	99.93	99.93
7	101.90	101.12	102.79	102.89	101.44	101.94	102.84	101.90	101.02	99.90	99.93	99.93
8	101.80	101.12	102.76	102.89	101.48	101.90	101.84	101.94	101.05	99.97	99.97	99.84
9	101.67	101.02	102.79	102.85	101.44	101.77	101.84	101.94	101.05	99.97	99.90	99.93
10	101.44	100.98	102.76	102.89	101.44	101.61	101.84	101.94	101.02	99.90	99.90	100.46
11	100.52	100.95	102.72	102.85	101.48	101.61	101.84	101.87	101.05	99.93	99.90	100.75
12	100.03	100.92	102.79	102.85	101.44	101.61	101.97	101.87	100.98	99.90	99.90	101.05
13	100.03	101.18	102.82	102.85	101.48	101.61	101.97	101.90	100.92	99.93	99.90	101.12
14	100.03	101.15	102.79	102.82	101.48	101.61	101.97	101.90	100.89	99.93	99.93	101.02
15	100.13	101.18	103.02	102.89	101.44	101.51	101.97	101.90	100.89	99.90	99.90	101.02
16	100.30	101.21	103.02	102.89	101.44	101.54	101.94	101.90	100.59	99.93	99.93	100.95
17	100.13	101.28	103.02	102.76	101.48	101.67	101.97	101.94	100.56	99.93	99.93	100.93
18	100.10	101.31	102.95	102.69	101.48	101.67	101.97	101.90	100.36	99.90	99.90	100.93
19	100.07	101.35	103.05	102.69	101.48	101.74	101.97	101.87	100.23	99.90	99.90	100.95
20	100.10	101.28	103.08	102.69	101.48	101.74	101.97	101.87	100.30	99.90	99.87	100.98
21	100.23	101.38	103.05	102.72	101.51	101.80	101.97	101.84	100.39	99.90	99.97	100.98
22	100.13	101.38	103.05	102.46	101.48	101.80	101.97	101.77	99.90	99.87	99.93	100.93
23	100.10	101.41	103.08	102.36	101.48	101.84	101.97	101.77	100.00	99.90	99.93	101.02
24	100.80	101.38	103.05	102.36	101.48	101.84	101.97	101.84	99.84	99.87	99.93	101.02
25	100.16	101.35	103.08	102.36	101.51	101.87	101.97	101.90	99.84	99.93	99.93	100.98
26	100.13	101.38	103.08	102.36	101.44	101.87	101.97	101.90	99.84	99.90	99.93	101.02
27	100.20	101.41	103.02	102.36	101.51	101.84	101.97	101.94	99.84	99.93	99.97	101.02
28	100.23	101.44	102.82	102.33	101.48	101.84	102.03	101.54	99.87	99.93	99.93	101.02
29	100.20		102.82	102.13	101.48	101.87	102.00	101.12	99.97	99.90	100.00	101.05
30	100.36		102.79	101.77	101.44	101.84	101.97	101.18	100.00	99.93	100.00	101.02
31	100.72		102.76		101.48		102.00	101.05		99.93		101.18
Avg.	100.69	101.28	102.85	102.66	101.48	101.77	101.94	101.80	100.56	99.93	99.93	100.69

## COLORADO RIVER IMMEDIATELY BELOW MORELOS DAM - STAGES

**DESCRIPTION:** Water-stage recorder located on the right bank of the Colorado River in Mexico immediately downstream from Morelos Dam, 1.1 miles downstream from the northerly international boundary, and about 7.5 miles downstream from the Colorado River below Yuma Main Canal Wasteway. Since April 17, 1969, zero of the gage is at mean sea level, U. S. C. & G. S. datum; prior to that date zero of the gage was 0.16 foot below mean sea level.

**RECORDS:** Records obtained and furnished by the Mexican Section of the Commission. Records available: Staff gage heights, February 20, 1951 to June 6, 1966; continuous record of gage heights June 7, 1966 through 1971.

**REMARKS:** On June 7, 1966 a continuous water-stage recorder was installed; prior to this date mean daily gage heights were determined from hourly readings of staff gage.

**EXTREMES:** Maximum mean daily gage height, 112.63 feet on January 2, 1958; minimum mean gage height, 98.13 feet several days during March and April 1967.

Mean Daily Gage Height in Feet 1971

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	99.48	100.20	98.56	98.56	99.41	98.59	98.59	98.72	99.18	106.40	100.52	100.49
2	99.54	100.20	98.59	98.59	99.51	98.59	98.59	98.72	99.31	104.04	100.52	100.49
3	99.57	100.20	98.59	98.59	99.48	98.59	98.59	98.72	99.31	100.85	100.52	100.52
4	99.44	99.93	98.59	98.56	99.41	98.59	98.59	98.72	99.28	100.69	100.52	100.52
5	99.34	99.74	93.56	98.56	99.38	99.41	98.59	98.75	99.28	100.66	100.56	100.52
6	99.31	99.67	98.56	98.56	99.34	99.44	98.59	98.75	99.25	100.66	100.52	100.52
7	99.44	99.64	98.56	98.56	99.34	99.34	98.59	98.75	99.28	100.62	100.56	100.52
8	99.51	99.67	98.56	98.56	99.51	99.38	98.59	98.75	99.28	100.62	100.56	100.52
9	99.61	99.61	98.56	98.56	99.54	99.38	98.59	98.75	99.25	100.62	100.49	100.36
10	99.74	99.57	98.56	98.56	99.54	99.34	98.59	98.79	99.15	100.62	100.49	100.16
11	99.93	99.54	98.56	98.56	99.57	99.34	98.59	98.79	99.18	100.52	100.49	100.10
12	100.16	99.48	98.59	98.56	99.61	99.34	98.62	98.79	99.31	100.59	100.49	99.93
13	100.20	99.34	98.59	98.56	99.57	99.31	99.48	98.82	99.51	100.52	100.52	99.57
14	100.16	99.31	98.59	98.56	99.61	99.34	99.67	98.82	99.57	100.52	100.52	99.51
15	100.16	99.31	98.59	98.56	99.57	99.28	99.67	98.82	99.57	100.52	100.52	99.34
16	100.20	99.28	98.59	98.59	99.57	98.92	99.70	98.82	100.46	100.52	100.52	99.28
17	100.20	99.21	98.56	98.59	99.57	99.11	99.70	98.82	100.66	100.56	100.52	99.08
18	100.20	98.98	98.52	98.59	99.61	99.11	99.70	98.82	100.72	100.52	100.56	99.08
19	100.20	98.92	98.52	98.59	99.54	98.72	99.34	99.38	100.72	100.49	100.49	99.18
20	100.20	98.79	98.52	98.59	99.57	98.59	98.92	99.67	100.72	100.49	100.52	99.15
21	100.23	98.69	98.52	98.59	99.57	99.41	98.88	100.56	100.75	100.49	100.52	99.21
22	100.20	98.62	98.56	98.59	99.57	98.59	98.88	101.90	100.72	100.49	100.52	99.25
23	100.20	98.59	98.52	98.62	99.57	98.59	98.88	101.87	100.66	100.49	100.49	99.25
24	100.20	98.56	98.52	98.62	99.64	98.59	98.85	101.90	100.72	100.49	100.49	99.21
25	100.20	98.69	98.52	98.62	99.67	98.59	98.72	102.30	100.75	100.49	100.52	99.28
26	100.20	98.62	98.56	98.62	99.70	98.59	98.75	102.62	100.69	100.52	100.52	99.28
27	100.20	98.72	98.56	98.62	99.70	98.59	98.75	102.23	100.69	100.52	100.52	99.34
28	100.20	98.59	98.56	98.62	99.74	98.59	98.72	102.62	100.72	100.52	100.52	99.41
29	100.20		98.56	98.75	99.74	98.59	98.72	101.64	101.15	100.49	100.49	99.41
30	100.16		98.56	99.08	99.74	98.59	98.72	99.67	104.46	100.49	100.46	99.38
31	100.16		98.56		99.77		98.72	99.31		100.52		99.31
Avg.	99.97	99.28	98.56	98.59	99.57	99.08	98.88	99.80	100.03	100.85	100.52	99.70

## WELLTON-MOHAWK DRAINAGE WATER DISCHARGED TO COLORADO RIVER BELOW MORELOS DAM

**DESCRIPTION:** Water-stage recorder located on downstream end of the Wellton-Mohawk Drainage Extension Channel on the Arizona bank of the Colorado River at the east end of the weir section of Morelos Dam, 1.1 miles downstream from the northerly international boundary. The elevation of the zero of the gage has not been determined.

**RECORDS:** Based on discharge measurements and a continuous record of gage heights. Station is operated by the United States Section of the Commission. Records available: November 16, 1965 through 1971.

**REMARKS:** Pursuant to Minute 218 of the Commission, an extension to the Wellton-Mohawk Drainage Conveyance Channel was constructed along the left bank of the Colorado River to a point immediately below Morelos Dam, a distance of about 12 miles, and placed in operation on November 16, 1965. Drainage flows may be discharged to the Gila River and thence to the Colorado River at the diversion structure, Main Outlet Drain Extension No. 1, at the upstream end of the extension; directly to the Colorado River at Main Outlet Drain Extension No. 2, 1.9 miles upstream from Morelos Dam; and immediately below Morelos Dam at this station, Main Outlet Drain Extension No. 3. The combined 1971 record of discharges to the river above Morelos Dam through M. O. D. E. No. 1 and No. 2 is shown on page 15.

### Mean Daily Discharge in Second Feet 1971 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	150	308	2.9	0	130	103	0	0	81.5	300	308	303
2	167	309	.1	0	138	104	0	0	99.4	295	308	308
3	167	306	.1	0	136	106	0	0	98.2	304	308	314
4	139	238	0	0	117	105	0	0	97.2	304	311	316
5	119	196	.2	0	110	83.2	0	0	98.2	308	314	311
6	117	188	.2	0	108	80.9	0	0	97.2	308	311	308
7	140	188	0	0	110	73.9	0	0	97.2	309	311	311
8	149	189	0	0	136	78.1	0	0	98.2	309	311	309
9	174	180	0	0	136	77.6	0	0	96.0	309	303	271
10	206	171	0	0	141	71.9	0	0	85.6	311	304	234
11	244	162	0	0	143	71.9	0	0	89.4	311	306	230
12	299	156	0	0	147	71.9	0	0	106	304	306	199
13	300	132	0	0	143	71.9	115	0	132	303	309	142
14	298	127	0	0	143	71.9	139	0	135	303	308	132
15	296	130	0	0	141	65.0	141	0	138	301	309	117
16	298	122	0	0	136	29.9	144	0	271	304	308	105
17	303	110	0	0	138	52.2	144	0	287	306	312	84.6
18	303	70.1	0	0	135	55.2	142	0	296	300	314	87.3
19	303	59.9	0	0	126	16.9	91.1	107	300	300	312	99.8
20	304	35.8	0	0	126	11.4	45.0	137	300	301	311	95.5
21	308	13.2	0	0	127	103	42.1	142	298	303	309	106
22	304	3.3	0	0	126	2.6	42.1	136	295	304	304	109
23	304	3.2	0	0	126	.7	42.8	252	288	306	300	107
24	306	10.8	0	0	130	0	41.3	290	294	306	303	106
25	303	30.4	0	0	134	0	25.9	295	296	304	308	110
26	303	29.7	0	0	134	0	33.1	300	286	304	311	112
27	303	31.8	0	0	135	0	31.8	298	289	308	311	121
28	304	17.9	0	6.8	138	0	3.7	296	295	308	309	134
29	303	0	0	34.1	136	0	.4	284	303	304	304	136
30	303	0	0	83.6	136	0	0	121	308	304	303	129
31	300	0	0	0	140	0	0	93.7	308	308	0	124
Sum	7,817	3,518.1	3.5	124.5	4,102	1,508.3	1,224.3	2,751.7	5,955.1	9,449	9,246	5,571.2
Current Year 1971												
Month	Extreme Gage Feet		Extreme Second Feet			Average Second Feet	Total Acre Feet	Period 1966-1971				
	High	Low	Day	High	Low			Average	Maximum	Minimum		
Jan.	3.21	1.75	21	308	6	117	252	15,505	14,497	17,740	11,029	
Feb.	3.22	.14	2	309	23	3.2	126	6,978	11,067	15,154	6,978	
Mar.	.11	0	1	2.9	1.4	0	1	6.9	3,503	8,083	247	6.9
Apr.	1.46	0	30	83.6	1	0	4.2	247	1,611	3,977	247	
May	2.07	1.72	12	147	6	108	132	8,136	7,325	11,207	3,160	
June	1.69	0	3	106	124	0	50.3	2,992	3,963	7,529	2,098	
July	2.02	0	116	144	1	0	39.5	2,428	1,760	3,461	0	
Aug.	3.18	0	26	300	1	0	88.8	5,458	2,102	5,458	34.9	
Sept.	3.24	1.42	30	303	1	81.5	199	11,812	5,666	13,565	3,575	
Oct.	3.22	3.15	10	311	2	295	305	18,742	18,172	18,742	17,599	
Nov.	3.24	3.15	5	314	23	300	308	18,339	17,959	18,478	17,234	
Dec.	3.25	1.48	4	316	17	84.6	180	11,050	14,493	16,374	11,050	
Yearly	3.25	0		316		0	140	101,694	106,118	126,160	100,028	

Mean daily

And other days

## COOPER WASTEWAY (VALLEY DIVISION, YUMA PROJECT)

**DESCRIPTION:** Water-stage recorder and control weir on wasteway for discharging regulatory waste water from the Cooper Canal to the Colorado River. This wasteway is located 0.5 mile downstream from the northerly international boundary and 0.6 mile upstream from Morelos Diversion Dam. Prior to July 14, 1971, the wasteway was located 0.4 mile downstream from Morelos Diversion Dam. This wasteway discharges waste water from the Valley Division of the Yuma Project in the United States into the Colorado River. Since July 14, 1971 zero of the gage is 117.64 feet above mean sea level, U.S.C. & G.S. datum.

**RECORDS:** Flow is computed from head on the weir measured by the water-stage recorder and weir rating determined by current meter measurements. Station operated by the United States Section of the Commission. Records available: Daily discharge, March 1950 through 1971, obtained by the United States Section; monthly discharge, January 1934 through March 1950, by the Bureau of Reclamation.

**EXTREMES:** Prior to March 1950, maximum monthly discharge 914 acre-feet in January 1940; minimum monthly discharge, zero for various months. Since March 1950, maximum instantaneous discharge, 79.3 second-feet on June 19, 1965, at a maximum gage height of 114.13 feet (old datum); minimum instantaneous discharge, zero during parts of each month.

Mean Daily Discharge in Second Feet 1971 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.6	0.8	0.8	0.6	2.2	1.8	1.8	2.1	2.7	* 0.2	1.1	0
2	.5	.8	1.4	1.6	1.6	3.2	1.8	.1	3.7	.2	.4	0
3	.5	* 1.4	2.6	1.3	.4	2.0	* .8	0	0	.2	2.9	0
4	.5	* .5	1.3	3.3	1.6	1.0	3.2	0	0	.1	3.7	3.9
5	2.2	.5	5.2	.9	3.7	1.2	" 1.6	0	0	3.3	1.6	.1
6	3.9	.4	1.6	.4	.4	6.1	* 1.4	0	0	1.3	1.6	0
7	3.3	.5	1.9	.2	.1	.9	1.0	0	0	0	.2	0
8	3.4	1.0	5.6	0	1.3	.4	3.8	0	0	* 5.6	1.4	0
9	1.7	3.3	.6	.4	4.5	.3	1.7	0	0	* 1.6	0	.7
10	1.3	2.8	.5	.7	.4	0	2.8	0	0	0	0	0
11	2.3	.8	.5	3.8	.8	1.8	.2	0	0	* 1.7	.6	0
12	1.7	1.2	4.9	.4	.9	1.1	.7	0	0	.6	1.6	2.7
13	.8	1.0	4.0	.3	1.0	.3	.3	2.4	0	.2	1.5	3.7
14	2.5	1.2	3.1	.2	2.2	* 8.8	0	.8	0	4.3	1.8	.5
15	2.3	1.4	1.0	1.4	1.8	* 4.0	0	.7	0	.5	.3	1.1
16	2.2	.4	.5	.8	1.7	2.1	1.0	.4	0	0	0	.1
17	* .5	.3	.6	.6	1.7	.4	4.7	0	0	0	0	.1
18	* 2.8	1.0	.8	1.1	2.6	* .4	.6	0	0	.1	0	.1
19	4.4	2.8	2.0	.7	1.0	" .5	.1	2.4	3.2	0	14.6	0
20	.8	.9	1.1	.8	.7	" .5	.1	.5	0	0	1.0	0
21	5.4	5.2	7.2	5.3	2.0	1.0	.1	2.4	0	0	.3	0
22	2.4	1.0	6.7	1.3	1.3	.6	1.1	1.6	0	.5	.2	0
23	.4	.4	.7	.8	1.4	* 2.7	.6	.5	0	7.8	.1	0
24	.6	1.3	1.0	.7	2.2	2.3	.2	0	.5	.7	3.3	0
25	.9	3.3	2.3	.6	1.5	* 1.7	0	1.2	0	.4	.6	0
26	4.9	1.5	1.9	3.8	2.4	" 1.3	1.1	0	0	.2	.3	0
27	1.1	7.0	.5	1.3	2.3	" 1.8	0	0	0	.1	1.9	0
28	.6	4.7	2.8	.6	.8	* 1.5	0	.4	0	0	1.1	0
29	1.8		4.3	.5	1.1	1.5	0	2.7	2.0	1.6	.3	3.4
30	.9		.6	.4	1.8	2.3	.3	0	.4	.3	.1	.5
31	.8		.5		.8		2.7	2.4		.8		.1
Sum	58.0	47.9	68.5	34.8	48.2	53.5	33.7	20.6	12.5	32.3	42.5	17.0

Month	Current Year 1971								Period 1935-1971		
	Extreme Gage Feet		Extreme Second Feet				Average Second Feet	Total Acre Feet	Acre Feet		
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum
Jan.	112.20	111.03	21	18.1	13	0.2	1.9	115	187	914	0
Feb.	112.35	111.00	27	21.8	18	0	1.7	95.0	165	400	6
Mar.	112.54	111.03	8	26.6	17	.2	2.2	136	177	517	0
Apr.	112.24	111.00	26	19.1	† 7	0	1.2	69.0	190	425	40
May	112.50	111.00	18	25.6	† 7	0	1.6	95.6	182	440	76
June	112.60	111.00	6	28.1	† 9	0	1.8	106	171	595	47
July	2.38	0	17	44.0	† 12	0	1.1	66.8	155	516	0
Aug.	1.60	0	31	26.6	† 1	0	.7	40.9	121	617	0
Sept.	2.30	0	19	42.2	† 3	0	.4	24.8	121	462	0
Oct.	2.25	0	5	41.0	† 4	0	1.0	64.1	150	490	0
Nov.	2.13	0	19	38.3	† 2	0	1.4	84.3	170	462	9
Dec.	2.34	0	12	43.1	† 1	0	.5	33.7	199	592	33.7
Yearly	112.60	0		44.0		0	1.3	931.2	1,988	4,500	931.2

\* Partly estimated

" Estimated

† And other days

## COLORADO RIVER AT MORELOS GAGING STATION - DISCHARGES

**DESCRIPTION:** Water-stage recorder on the left (Arizona) bank of the river, and cableway 1.8 miles downstream from the northerly international boundary, 0.7 mile downstream from Morelos Diversion Dam, and about 9 miles downstream from Yuma, Arizona, along the river levee. The cableway and recorder are 1,260 feet and 1,300 feet, respectively, below the mouth of Cooper Wasteway. Zero of gage is at mean sea level, U. S. C. & G. S. datum.

**RECORDS:** Based on 147 current meter measurements during the year, 99 by the United States Section, 48 by the Mexican Section of the Commission, and a continuous record of gage heights. Computations by shifting control methods. Records available: Daily discharges, January 1, 1954 through 1971; continuous record of gage heights, July 20, 1952 through 1971.

**REMARKS:** Reservoirs, diversions in the United States and Mexico, drainage returns, and waste flows modify the river flow at this station. The record at this station, less that of Cooper Wasteway and Main Outlet Drain Extension No. 3, represents the river flow passing Morelos Diversion Dam.

**EXTREMES:** Maximum instantaneous discharge, 22,240 second-feet on January 4, 1955; maximum gage height, 112.18 feet on January 28, 1958. Minimum discharge, no flow on various occasions.

## Mean Daily Discharge in Second Feet 1971 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	151	314	13.4	8.5	121	116	9.0	8.8	86.5	1,620	312	306
2	164	316	10.4	9.0	133	115	9.2	9.0	103	939	312	306
3	164	316	11.3	9.2	133	118	8.8	9.0	103	357	312	312
4	145	257	11.8	9.0	124	116	11.8	9.0	101	331	315	313
5	131	211	12.6	8.8	120	92.0	10.4	9.2	101	326	318	310
6	127	195	10.0	8.8	116	93.0	9.5	9.2	101	324	315	312
7	141	193	9.5	8.5	120	83.9	9.2	9.0	102	321	315	308
8	151	196	13.8	8.2	138	86.5	9.2	8.8	103	319	315	308
9	171	190	10.4	8.5	142	87.8	9.2	9.2	103	319	310	280
10	203	180	10.4	8.5	142	82.6	9.5	10.0	93.0	319	307	244
11	246	171	10.8	9.5	145	81.3	9.0	10.4	94.3	319	310	238
12	292	160	13.1	9.0	148	82.6	10.0	* 10.8	108	313	310	211
13	301	139	10.8	8.8	145	81.3	121	10.4	130	308	313	154
14	301	133	12.6	9.2	149	87.8	142	10.0	137	310	313	142
15	299	135	11.3	10.0	146	78.7	142	10.0	138	308	315	122
16	299	129	10.4	10.4	144	39.5	148	* 11.8	266	308	313	114
17	301	116	10.0	9.5	145	59.8	149	11.8	295	312	315	97.4
18	304	82.6	8.8	9.5	145	62.2	146	11.8	304	308	316	96.1
19	304	72.2	9.0	10.4	136	30.8	105	107	306	307	313	100
20	301	46.2	9.0	10.0	135	23.6	52.8	148	306	306	312	97.4
21	308	29.8	11.8	13.6	137	* 109	49.5	254	308	307	313	108
22	306	15.2	11.8	10.8	137	* 12.2	49.5	450	304	307	310	113
23	306	12.6	8.8	10.4	137	12.2	50.6	462	295	307	306	110
24	310	17.9	9.2	10.0	140	10.4	49.5	479	297	307	306	106
25	308	36.0	10.0	10.0	142	10.8	* 33.2	535	304	307	307	113
26	312	36.0	10.0	12.1	142	10.4	* 40.0	595	297	307	312	115
27	310	42.0	9.0	10.9	142	9.2	* 39.0	522	295	310	312	124
28	310	29.0	12.6	16.0	144	9.0	* 15.0	588	304	312	310	136
29	310		12.2	41.0	144	9.0	9.5	447	356	310	308	136
30	310		8.8	87.2	145	10.0	9.0	147	1,060	308	307	132
31	308		8.8		146		8.8	105		312		122
Sum	7,894	3,770.5	332.4	405.3	4,285	1,820.6	1,474.2	5,017.2	6,900.8	11,668	9,352	5,687.9
Month	Current Year 1971											
	Extreme Gage Feet		Extreme Second Feet				Average Second Feet	Total	Period 1954-1971			
	High	Low	Day	High	Day	Low		Acre Feet	Average	Maximum	Minimum	
Jan.	99.82	98.83	26	320	6	123	255	15,658	172,682	969,540	949	
Feb.	99.82	97.80	1	322	23	10.4	135	7,479	87,837	414,310	977	
Mar.	98.05	97.65	1	26.8	18	8.5	10.7	659	56,358	630,230	659	
Apr.	98.54	97.64	30	95.6	17	8.2	13.5	804	43,144	532,320	804	
May	99.21	98.55	18	160	1	95.6	138	8,499	52,135	375,970	460	
June	99.57	97.84	21	185	128	8.8	60.7	3,611	12,611	119,980	834	
July	99.23	97.80	13	155	3	8.5	47.6	2,924	11,695	89,430	654	
Aug.	102.49	97.83	28	682	1	8.8	162	9,951	20,041	125,590	702	
Sept.	106.09	98.78	30	1,810	1	83.9	230	13,688	18,054	87,830	113	
Oct.	106.09	100.10	1	1,810	15	304	376	23,143	48,371	172,940	9,750	
Nov.	100.14	100.04	5	318	10	304	312	18,549	87,304	356,390	4,869	
Dec.	100.11	98.71	4	313	18	94.8	183	11,282	118,791	643,850	1,111	
Yearly	106.09	97.64		1,810		8.2	160.3	116,247	729,023	3,957,730	101,758	

\* Partly estimated

‡ Estimated

† And other days



## COLORADO RIVER AT MORELOS GAGING STATION - STAGES

(See Preceding Page For Description)

Mean Daily Gage Height in Feet 1971

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	98.99	99.78	97.85	97.65	98.82	99.01	97.84	97.85	98.82	105.66	100.12	100.06
2	99.09	99.79	97.80	97.67	98.94	99.01	97.84	97.85	98.95	103.52	100.12	100.06
3	99.10	99.79	97.81	97.68	98.94	99.03	97.81	97.85	98.95	100.58	100.12	100.10
4	98.98	99.53	97.81	97.67	98.85	99.03	97.88	97.85	98.92	100.39	100.13	100.11
5	98.88	99.29	97.83	97.66	98.81	98.88	97.84	97.86	98.91	100.36	100.14	100.09
6	98.86	99.21	97.77	97.66	98.79	98.89	97.82	97.86	98.90	100.35	100.12	100.10
7	98.97	99.20	97.76	97.65	98.81	98.82	97.81	97.85	98.90	100.33	100.12	100.08
8	99.04	99.22	97.82	97.64	98.99	98.84	97.81	97.84	98.90	100.32	100.12	100.08
9	99.15	* 99.18	97.76	97.65	99.03	98.85	97.81	97.85	98.89	100.31	100.09	99.92
10	99.32	# 99.14	97.76	97.65	99.03	98.82	97.82	97.86	98.80	100.30	100.07	99.71
11	99.53	* 99.10	97.77	97.69	99.05	98.81	97.80	97.86	98.81	100.29	100.08	99.67
12	99.75	99.03	97.82	97.67	99.08	98.82	97.83	* 97.87	98.94	100.24	100.08	99.50
13	99.78	98.91	97.77	97.66	99.06	98.81	98.93	# 97.86	99.14	100.20	100.10	99.14
14	99.77	98.87	* 97.81	97.68	99.09	98.85	99.14	# 97.85	99.21	100.20	100.10	99.05
15	99.76	98.88	* 97.77	97.69	99.07	98.78	99.14	# 97.85	99.22	100.18	100.11	98.91
16	99.76	98.85	97.75	97.70	99.06	98.42	99.18	* 97.89	100.05	100.17	100.10	98.85
17	99.77	98.77	97.74	97.68	99.07	98.62	99.19	97.89	100.22	100.19	100.11	98.73
18	99.78	98.54	97.70	97.68	99.08	98.63	99.17	97.89	100.27	100.16	100.12	98.72
19	99.78	98.47	97.71	97.70	99.02	98.32	98.85	98.86	100.28	100.15	100.10	98.75
20	99.76	98.26	97.70	97.69	99.02	98.23	98.44	99.21	100.29	100.14	100.09	98.72
21	99.79	98.07	97.77	97.77	99.04	* 98.95	98.40	99.90	100.31	100.15	100.10	98.79
22	99.78	* 97.89	97.77	97.71	99.05	* 97.98	98.39	101.13	100.30	100.15	100.08	98.82
23	99.77	* 97.84	* 97.69	97.70	99.05	97.97	98.39	101.21	100.26	100.15	100.05	98.80
24	99.79	97.92	# 97.70	97.69	99.08	97.92	98.37	101.30	100.28	100.15	100.05	98.79
25	99.77	98.15	* 97.71	97.69	99.10	97.92	98.21	101.64	100.33	100.15	100.06	98.82
26	99.78	98.15	* 97.70	97.73	99.12	97.90	98.28	101.99	100.30	100.14	100.09	98.84
27	99.77	98.21	* 97.67	97.71	99.14	97.86	98.27	101.57	100.29	100.15	100.09	98.90
28	99.77	98.07	# 97.76	97.76	99.17	97.85	97.96	101.95	100.34	100.14	100.08	98.99
29	99.76		* 97.75	98.05	99.18	97.85	97.88	101.12	100.66	100.13	100.08	98.99
30	99.76		* 97.66	98.47	99.19	97.88	97.86	99.26	103.68	100.11	100.07	98.96
31	99.75		* 97.66		99.20		97.85	98.96		100.12		98.89
Avg.	99.53	98.79	97.75	97.72	99.03	98.52	98.25	99.02	99.74	100.50	100.10	99.29

\* Partly Estimated

# Estimated

## ELEVEN MILE WASTEWAY (VALLEY DIVISION, YUMA PROJECT)

DESCRIPTION: Water-stage recorder and control weir on wasteway for discharging water from the West Main Canal to the Colorado River. This wasteway is located in Arizona, 4.3 miles downstream from the northerly international boundary and 3.2 miles downstream from Morelos Diversion Dam. It is the largest of three wasteways discharging waste water from the Valley Division of the Yuma Project in the United States into the limitrophe section of the Colorado River.

RECORDS: Flow is computed from head on the weir measured by the water-stage recorder and weir rating determined by current meter measurements. Station operated by the United States Section of the Commission. Records available: Daily discharge, January 1951 through 1971, obtained by the United States Section; monthly discharge, January 1924 through 1950, by Bureau of Reclamation.

EXTREMES: Prior to January 1951, maximum monthly discharge, 9,740 acre-feet in August 1940; minimum monthly discharge, zero in April 1941. Since January 1, 1951, maximum instantaneous discharge, 800 second-feet on December 3, 1961, at a maximum gage height of 117.60 feet; minimum instantaneous discharge, zero during parts of most years.

## Mean Daily Discharge in Second Feet 1971 — Annual and Period Summary

Mean Daily Discharge in Second Feet 1971												
Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	15.8	1.2	4.5	1.7	0.4	1.3	1.4	24.5	1.4	6.6	1.2	1.3
2	1.5	1.2	1.9	1.7	.4	1.2	1.3	21.1	1.3	2.5	1.2	1.5
3	5.9	3.0	1.3	1.7	.5	1.2	1.2	3.8	1.3	2.2	1.1	1.6
4	1.2	2.6	1.7	16.0	.5	3.3	1.5	4.9	1.3	7.2	1.1	1.5
5	3.9	1.2	1.5	28.5	.7	1.4	1.6	* 1.2	1.6	1.2	1.1	47.9
6	16.9	1.2	3.1	5.7	.9	47.8	1.4	" 1.2	1.6	2.3	1.2	32.9
7	8.0	1.2	8.8	2.9	1.0	21.2	1.3	" 1.3	1.6	3.8	1.4	4.5
8	7.8	4.7	5.1	1.3	1.1	4.8	1.2	" 1.2	1.7	1.2	1.4	2.2
9	1.4	1.3	1.5	1.3	1.2	3.8	1.5	* 1.2	1.6	1.3	1.3	1.5
10	1.6	1.3	1.4	1.2	1.2	1.3	1.5	1.2	1.6	2.8	1.3	1.4
11	2.1	2.5	1.4	3.7	1.1	1.3	1.4	1.2	1.7	6.8	1.3	1.6
12	1.2	8.2	1.5	6.8	.8	1.2	1.6	1.2	1.6	1.3	1.4	1.5
13	1.1	1.2	1.8	2.2	.7	1.4	1.6	1.2	2.0	5.5	2.1	1.6
14	3.6	42.2	33.6	6.2	.7	1.3	1.4	1.3	1.7	1.2	46.0	1.6
15	10.4	25.5	25.1	1.8	1.0	1.4	1.4	3.1	1.5	1.4	25.4	1.4
16	2.0	4.2	4.4	2.1	1.4	1.3	1.4	1.4	1.3	1.3	1.3	1.3
17	1.2	2.6	2.8	5.6	2.0	1.0	1.3	1.4	1.3	3.5	.5	1.3
18	1.3	1.0	1.2	7.1	2.1	.8	1.4	1.5	1.1	1.3	1.0	1.2
19	1.4	1.2	1.2	2.4	2.1	1.0	1.4	1.6	1.2	1.2	1.3	1.2
20	1.9	8.4	1.1	1.9	1.1	1.1	1.3	* 1.4	1.5	1.2	1.3	1.3
21	1.9	8.5	1.6	1.9	.6	1.1	1.3	" 4.9	1.6	1.2	2.8	1.7
22	1.2	13.4	1.3	1.9	.5	1.2	1.3	" 1.3	1.6	1.2	1.5	2.5
23	1.2	1.9	1.3	1.8	.5	1.4	1.3	* 1.3	1.6	3.8	1.4	2.1
24	18.1	12.1	1.3	1.7	.5	1.2	1.3	* 1.4	1.6	12.2	1.4	1.6
25	7.0	6.7	1.5	1.4	.4	1.3	1.3	1.5	1.6	3.8	1.3	1.6
26	1.2	3.1	6.8	1.3	.3	1.4	1.3	3.7	1.6	1.6	1.2	1.6
27	1.1	2.6	6.5	1.1	.3	1.4	1.3	1.4	1.5	3.0	1.2	1.6
28	1.1	6.3	8.2	.8	.2	1.3	1.2	1.5	1.4	1.2	1.4	2.0
29	1.1	5.1	.6	.1	1.4	1.2	1.2	1.3	23.3	3.8	1.4	1.6
30	3.2	1.7	.4	2.2	1.6	1.2	1.2	1.4	2.6	2.2	1.4	1.9
31	1.5	1.7	1.7	1.4	1.4	1.4	1.1	1.4		3.2		2.0
Sum	128.8	170.5	141.9	114.7	27.9	112.4	41.9	98.0	68.3	93.0	108.9	130.5
Current Year 1971								Period 1935-1971				
Month	Extreme Gage Feet		Extreme Second Feet				Average Second Feet	Total Acre Feet	Acre Feet			
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum	
Jan.	113.58	111.85	3	103	127	1.0	4.2	255	3,614	9,570	215	
Feb.	115.45	111.81	14	236	17	.6	6.1	338	2,902	8,430	193	
Mar.	114.53	111.31	14	160	17	.6	4.6	281	2,732	6,230	171	
Apr.	113.49	111.78	4	98.0	30	.4	3.8	228	2,524	6,300	0	
May	113.18	111.73	30	81.9	29	.1	.9	55.3	3,035	9,320	55.3	
June	115.71	111.82	6	226	9	.7	3.7	223	2,871	7,440	130	
July	111.92	111.86	12	1.9	30	1.1	1.4	83.1	2,903	8,320	83.1	
Aug.	114.07	111.81	1	132	4	.6	3.2	194	2,474	9,740	194	
Sept.	114.42	111.86	29	153	18	1.1	2.3	135	1,814	6,140	117	
Oct.	112.58	111.85	1	42.5	19	1.1	3.0	184	2,468	5,680	184	
Nov.	115.92	111.30	14	293	116	.5	3.6	216	2,934	8,220	216	
Dec.	115.90	111.82	5	295	8	.7	4.2	259	3,884	9,430	164	
Yearly	115.92	111.73		293		0.1	3.4	2,451.4	34,160	82,900	2,451.4	

\* Partly estimated

" Estimated

† And other days

## COLORADO RIVER AT ELEVEN MILE GAGE - STAGES

DESCRIPTION: Water-stage recorder on the left (Arizona) bank of the river, 4.3 miles downstream from northerly international boundary, 3.2 miles downstream from Morelos Diversion Dam, about 50 feet downstream from the mouth of Eleven Mile Wasteway of the Yuma Project, and 11 miles downstream from Yuma, Arizona, along the river levee. Zero of gage is at mean sea level, U. S. C. & G. S. datum.

RECORDS: Mean daily gage heights based on continuous water-stage records. Records available: Continuous record of gage heights, November 1947 through 1971; once weekly readings obtained by the U. S. Bureau of Reclamation, January 1940 through October 1947.

REMARKS: This station is maintained by the United States Section of the Commission as part of the continuing study of channel conditions in the limitrophe section of the river.

EXTREMES: Since November 1947, maximum mean daily gage height, 108.20 feet on January 2, 1958; minimum mean daily gage height, 94.95 feet on June 22, 1968.

Mean Daily Gage Height in Feet 1971

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	96.31	96.95	* 95.19	95.01	95.96	96.08	95.06	95.23	96.03	102.29	97.58	97.30
2	96.32	96.98	* 95.08	95.01	96.07	96.05	95.05	95.25	96.12	100.78	97.57	97.29
3	96.37	96.99	95.08	95.03	96.09	96.05	95.04	95.12	96.15	98.00	97.56	97.31
4	96.22	96.76	* 95.09	95.17	96.03	96.05	95.05	95.11	96.15	97.68	97.55	97.32
5	96.13	96.55	95.07	95.24	95.96	95.91	95.03	95.08	96.14	97.63	97.55	97.47
6	96.19	96.47	* 95.10	95.06	95.93	96.08	95.03	95.09	96.14	97.62	97.53	97.46
7	96.21	96.45	* 95.15	95.02	95.94	95.96	95.02	95.10	96.18	97.64	97.53	97.32
8	96.28	96.48	* 95.10	94.99	96.07	95.84	95.05	95.10	96.17	97.64	97.52	97.30
9	96.36	96.44	* 95.04	94.99	96.12	95.84	95.02	95.12	96.18	97.64	97.49	97.18
10	96.52	96.38	95.07	94.99	96.12	95.78	95.03	95.14	96.13	97.64	97.44	96.99
11	96.72	96.34	95.07	95.05	96.14	95.78	95.02	95.13	96.13	97.67	97.45	96.93
12	96.91	96.33	95.11	95.06	96.18	95.77	95.05	95.10	96.21	97.65	97.45	96.79
13	96.97	96.19	95.10	95.01	96.18	95.76	95.74	95.10	96.37	97.64	97.46	96.51
14	96.96	96.29	95.30	95.05	96.20	95.80	96.01	95.10	96.45	97.62	97.59	96.43
15	96.98	96.33	95.31	95.03	96.19	95.74	96.03	95.12	96.49	97.62	97.60	96.29
16	96.96	96.16	95.14	95.04	96.18	95.48	96.09	95.10	97.08	97.62	97.45	96.25
17	96.96	96.06	95.09	95.07	96.21	95.59	96.11	95.13	97.31	97.66	97.43	96.09
18	96.96	95.88	95.03	95.09	96.22	95.60	96.13	95.15	97.39	97.65	97.44	96.07
19	96.95	95.81	95.05	95.06	96.17	95.38	95.95	95.75	97.43	97.62	97.43	96.14
20	96.93	* 95.64	95.05	95.04	96.15	95.24	95.55	96.05	97.46	97.62	97.41	96.11
21	96.95	* 95.47	95.10	95.10	96.16	95.88	95.51	96.51	97.49	97.62	97.40	96.15
22	96.95	* 95.35	95.11	95.05	96.15	* 95.20	95.49	97.58	97.50	97.63	97.38	96.19
23	96.94	* 95.24	95.05	95.05	96.15	* 95.13	95.48	97.70	97.49	97.62	97.34	96.18
24	97.00	95.32	95.04	95.05	96.17	* 95.12	95.47	97.82	97.50	97.67	97.33	96.16
25	96.97	95.45	95.04	95.06	96.19	* 95.12	95.35	98.06	97.56	97.63	97.34	96.17
26	96.94	95.41	95.11	95.07	96.19	* 95.11	95.39	98.49	97.56	97.62	97.35	96.19
27	96.94	95.46	95.09	95.09	96.21	* 95.10	95.40	98.13	97.56	97.63	97.35	96.22
28	96.93	95.38	95.14	95.10	96.23	* 95.09	95.20	98.41	97.62	97.61	97.35	96.29
29	96.93		95.12	95.33	96.22	95.08	95.08	97.99	97.63	97.60	97.33	96.29
30	96.92		95.04	95.66	96.24	95.08	95.08	96.52	99.90	97.59	97.31	96.28
31	96.91		95.02		96.23		95.09	96.19		97.58		96.20
Avg.	96.73	96.09	95.10	95.09	96.14	95.59	95.37	96.05	96.92	97.89	97.45	96.61

\* Partly Estimated

\* Estimated

## TWENTY-ONE MILE WASTEWAY (VALLEY DIVISION, YUMA PROJECT)

**DESCRIPTION:** Water-stage recorder and control weir on wasteway for discharging water from the West Main Canal to the Colorado River. Prior to May 1, 1971, water-stage recorder and control weir were located at a site 200 feet upstream on wasteway. This wasteway is located in Arizona 18.5 miles downstream from the northerly international boundary, 17.4 miles downstream from Morelos Diversion Dam, and 2.2 miles upstream from the southerly international boundary. It is the farthest downstream of the two wasteways discharging waste water from the Valley Division of the Yuma Project in the United States into the limitrophe section of the Colorado River. The elevation of the zero of the gage at the new location has not been determined.

**RECORDS:** Flow is computed from head on the weir measured by the water-stage recorder and weir rating determined by current meter measurements. Station operated by the United States Section of the Commission. Records available: Daily discharge, January 1951 through 1971, obtained by the United States Section; monthly discharge, March 1939 through 1950, by Bureau of Reclamation.

**REMARKS:** This wasteway was completed and flow began March 14, 1939. Since May 13, 1944, waste water from the West Main Canal which previously discharged across the southerly land boundary has been returned to the Colorado River through this wasteway.

**EXTREMES:** Prior to January 1951, maximum monthly discharge, 2,860 acre-feet, in January 1946; minimum monthly discharge, 122 acre-feet in September 1950. Since January 1, 1951, maximum instantaneous discharge, 102 second-feet on January 24, 1954, at a maximum gage height of 95.46 feet (old datum); minimum instantaneous discharge, zero during a part of most months.

### Mean Daily Discharge in Second Feet 1971 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	7.0	2.8	4.3	0	0	0	0	0	0	0	0	0
2	.5	3.7	0	0	0	0	.1	0	0	0	0	0
3	.1	4.3	0	0	1.8	0	.1	0	0	0	0	0
4	1.5	8.7	0	0	0	0	0	0	0	0	0	0
5	2.6	.2	0	8.4	.5	0	0	0	0	0	0	0
6	10.5	.2	0	.8	0	0	0	0	0	0	0	0
7	3.4	4.6	0	.4	0	22.5	0	0	0	0	0	0
8	4.9	4.7	0	.1	0	1.4	0	0	0	0	0	0
9	2.2	2.6	0	1.0	0	.3	0	0	0	0	0	0
10	.7	4.0	0	0	0	.1	0	0	0	0	0	0
11	0	2.1	0	0	0	0	0	0	0	0	0	0
12	0	3.4	0	0	0	0	0	0	0	0	0	0
13	1.3	1.2	0	0	0	0	0	0	0	0	0	0
14	1.4	8.0	2.9	0	1.9	0	0	0	0	0	17.2	0
15	5.7	23.4	3.2	0	8.3	0	0	0	0	0	15.7	0
16	4.0	.2	0	0	5.7	0	0	0	0	0	0	0
17	2.7	0	0	0	6.4	2.1	0	0	0	0	0	0
18	1.8	0	0	0	0	.1	0	0	0	6.9	0	0
19	1.2	.1	0	0	0	0	0	0	0	10.6	0	0
20	.3	3.7	0	0	0	0	0	.1	0	.1	0	0
21	1.3	5.8	0	0	0	0	0	.1	0	2.0	0	0
22	1.8	3.0	0	0	0	0	0	0	0	0	0	0
23	.9	3.4	0	0	0	0	0	.3	0	0	0	0
24	1.5	6.3	0	.7	0	0	0	0	0	0	0	0
25	0	2.4	0	0	.2	0	0	0	0	0	0	0
26	.6	0	.9	0	0	0	0	0	0	0	0	0
27	2.1	0	.3	0	0	0	0	0	0	0	0	0
28	0	1.2	0	0	0	0	0	0	0	0	0	0
29	3.9	0	0	0	0	0	.3	0	3.1	0	0	0
30	1.5	0	0	0	0	0	.1	0	0	0	0	0
31	5.8	0	0	0	0	0	0	0	0	0	0	0
Sum	71.2	100.0	11.5	11.4	24.8	26.5	0.6	0.5	3.1	19.6	32.9	0

Month	Extreme Gage Feet		Extreme Second Feet				Average	Total	Period 1939-1971		
	High	Low	Day	High	Second Feet		Feet	Acre Feet	Acre Feet		
					Day	Low			Average	Maximum	Minimum
Jan.	94.68	92.92	22	45.7	† 3	0	2.3	141	913	2,860	141
Feb.	94.77	92.92	15	49.3	† 6	0	3.6	198	786	2,510	138
Mar.	93.79	92.92	1	14.7	† 1	0	.4	22.5	723	1,660	22.8
Apr.	94.26	92.92	5	29.6	† 1	0	.4	22.6	779	1,940	22.6
May	1.05	0	17	25.2	† 1	0	.3	49.2	949	2,470	49.2
June	1.56	0	7	51.3	† 1	0	.9	52.6	827	2,350	52.6
July	.57	0	29	9.1	† 1	0	0	1.2	715	1,950	1.2
Aug.	.27	0	23	2.6	† 1	0	0	1.0	751	2,530	1.0
Sept.	.92	0	29	20.7	† 1	0	.1	6.1	674	2,180	6.1
Oct.	1.20	0	19	32.0	† 1	0	.6	33.9	817	2,100	38.9
Nov.	1.17	0	14	30.6	† 1	0	1.1	65.3	944	2,380	65.3
Dec.	0	0	† 1	0	† 1	0	0	0	1,042	2,680	0
Yearly	94.77	0		51.3		0	.9	598.7	9,920	24,370	598.7

† And other days

## DIVERSIONS BY PUMPS IN THE UNITED STATES - LIMITROPHE SECTION

DESCRIPTION: One privately operated pump located on the left bank of the Colorado River in the limitrophe section pumps water for irrigating land in the river floodway in the United States.

RECORDS: Quantities of water pumped are estimated by the United States Section of the Commission from weekly readings of a running time meter attached to the pump, and pump capacity. Records available: January 1956 through 1971.

REMARKS: These records are used in the computations of water delivered to Mexico.

## Mean Daily Discharge in Second Feet 1971 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	4.8	0	0	0	0	0	0	0	0	0	0
2	0	5.4	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	7.2	0	0	0	0	0	0	0	0	0	0
17	0	1.5	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
21	3.6	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0
24	4.8	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0
29	4.2	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0	0	0
Sum	12.6	18.9	0	0	0	0	0	0	0	0	0	0
Current Year 1971												
Month	Extreme Gage Feet		Extreme Second Feet				Average Second Feet	Total Acre Feet	Period 1956-1971			
	High	Low	Day	High	Day	Low			Acre Feet			
Jan.			24	4.8	† 1	0	0.4	25	120	280	0	
Feb.			16	7.2	† 3	0	0.7	37.5	215	500	26.2	
Mar.				0	0	0	0	0	264	600	0	
Apr.				0	0	0	0	0	332	670	0	
May				0	0	0	0	0	370	770	0	
June				0	0	0	0	0	386	800	0	
July				0	0	0	0	0	399	820	0	
Aug.				0	0	0	0	0	263	800	0	
Sept.				0	0	0	0	0	248	940	0	
Oct.				0	0	0	0	0	174	390	0	
Nov.				0	0	0	0	0	137	330	0	
Dec.				0	0	0	0	0	97	230	0	
Yearly				7.2		0	0	62.5	3,005	6,480		62.5

† And other days

ø Mean daily

# EAST MAIN CANAL WASTEWAY (VALLEY DIVISION, YUMA PROJECT)

DESCRIPTION: Water-stage recorder and control weir located about 300 feet north of the international boundary near San Luis, Arizona, and 1.5 miles east of the Colorado River.

RECORDS: Wasteway discharges computed by United States Section of the Commission beginning November 1, 1953, from head on control weir as measured by water-stage recorder and weir ratings as determined by current meter measurements. Records available: October 1946 through 1971. Records of monthly discharges also are available for the periods January 1924 through June 1928, January 1932 through 1933, and April 1935 through September 1946.

REMARKS: Wasteway discharges from the East Main Canal comprise regulatory waste and drainage waters from the eastern half of the Valley Division of the Yuma Project and are considered as part of the volumes arriving at the limitrophe section of the Colorado River.

## Mean Daily Discharge in Second Feet 1971 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	13.9	.8	.4	16.7	2.9	15.2	11.5	12.6	7.2	2.1	10.3	.9
2	7.3	.9	2.4	.8	6.9	8.0	8.3	2.7	3.2	.2	4.6	5.9
3	4.3	3.5	5.1	3.9	6.3	19.8	1.3	3.8	3.7	7.6	2.2	8.8
4	6.1	.4	7.3	1.0	7.8	.4	4.4	8.6	3.9	16.6	.9	5.2
5	3.3	2.9	11.3	.3	2.3	7.1	11.6	15.1	.1	4.1	7.7	2.9
6	6.4	9.5	10.4	.8	0	2.1	10.0	4.5	.5	.4	6.4	8.5
7	3.8	7.3	4.8	3.8	6.6	6.6	8.6	4.8	5.2	11.6	10.5	4.9
8	6.0	.8	10.6	4.9	2.6	6.6	5.0	.1	7.1	8.8	* .5	1.8
9	5.1	12.0	7.7	0	2.4	0	1.6	10.5	.3	5.1	* 11.2	.1
10	2.9	1.0	3.5	1.2	4.5	.7	1.7	3.4	0	6.9	21.3	.4
11	1.3	.9	6.6	0	0	12.8	1.7	2.1	2.1	6.9	5.5	4.8
12	1.4	7.9	12.0	12.2	5.1	.3	.9	1.6	7.1	4.7	10.4	17.8
13	9.1	9.7	6.5	4.6	4.0	4.2	.7	2.9	7.6	2.8	9.8	10.2
14	5.3	2.8	2.9	6.2	4.6	11.5	7.6	.8	1.1	3.1	6.8	3.8
15	7.4	5.4	.6	3.2	2.3	4.3	8.0	8.0	4.6	.8	26.9	1.0
16	4.4	3.6	2.6	4.4	3.8	4.4	21.6	26.4	4.0	1.3	6.2	.1
17	5.5	6.1	5.4	.3	6.6	3.5	3.9	4.4	* 4.4	2.7	1.7	0
18	2.3	10.1	1.5	0	2.0	4.8	4.7	0	# 2.7	8.9	.6	.1
19	3.1	9.2	5.8	10.7	3.8	.4	12.6	4.0	# 7.2	5.0	4.0	10.6
20	6.6	12.1	.3	3.2	4.7	13.0	13.1	19.1	* 14.2	11.5	8.4	28.5
21	.5	* 9.5	4.2	.4	12.0	19.4	5.9	13.4	15.1	11.5	26.2	6.5
22	3.5	11.4	19.9	0	1.7	1.5	1.7	10.1	11.1	10.7	10.6	3.4
23	11.8	6.6	7.2	.1	.1	0	5.7	5.1	16.8	6.5	6.3	1.2
24	10.5	1.2	2.0	1.8	7.9	4.3	3.7	5.1	5.1	4.6	2.3	2.3
25	7.2	1.0	3.2	6.4	5.3	5.5	8.5	3.7	7.4	12.6	7.6	0
26	5.1	20.7	7.5	7.9	.8	3.8	7.8	14.1	4.8	12.9	5.8	1.1
27	10.1	10.2	1.4	2.6	4.8	8.4	8.9	8.9	3.1	3.6	1.0	5.9
28	9.3	2.3	12.1	4.6	5.3	2.6	10.1	7.3	10.5	4.1	.6	1.4
29	13.2		24.4	4.7	1.2	.3	8.5	4.0	27.1	12.8	16.2	2.3
30	13.3		19.6	9.4	3.5	8.7	4.7	9.6	18.9	7.8	15.1	2.0
31	2.5		11.8		1.5		6.9	4.3		8.3		4.8
Sum	192.5	169.8	221.0	116.1	123.3	180.2	211.2	221.0	206.1	206.5	247.6	147.2
Current Year 1971												
Month	Extreme Gage Feet		Extreme Second Feet				Average Second Feet	Total Acre Feet	Period 1935-1971			
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum	
Jan.	90.95	90.15	29	48.5	† 5	0	6.2	382	1,254	3,360	335	
Feb.	90.95	90.15	26	48.5	† 1	0	6.1	337	1,048	3,170	304	
Mar.	90.88	90.15	29	37.3	† 1	0	7.1	438	1,212	2,920	190	
Apr.	91.00	90.15	7	48.5	† 2	0	3.9	230	1,177	3,170	197	
May	90.95	90.15	† 19	43.8	† 2	0	4.0	245	1,293	3,040	245	
June	90.85	90.15	1	34.8	† 4	0	6.0	357	1,105	3,660	175	
July	90.74	90.15	1	26.0	† 3	0	6.8	419	1,194	3,590	182	
Aug.	90.92	90.15	15	40.9	† 3	0	7.1	438	1,216	3,960	169	
Sept.	91.00	90.15	29	48.5	† 5	0	6.9	409	1,108	3,170	159	
Oct.	90.95	90.15	10	43.8	† 2	0	6.7	410	1,165	3,280	410	
Nov.	91.03	90.15	6	51.5	† 5	0	8.3	491	1,281	3,570	313	
Dec.	91.00	90.15	13	48.5	† 8	0	4.7	292	1,254	3,080	292	
Yearly	91.00	90.15		51.5		0	6.2	4,448	14,307	38,310	4,448	

\* Partly estimated

† Estimated

† And other days

## YUMA MAIN DRAIN (VALLEY DIVISION, YUMA PROJECT)

**DESCRIPTION:** Water-stage recorders located in the forebay and afterbay, with flow meters in the four discharge pipes at the Boundary Pumping Plant on the Main Drain about 200 feet north of the international boundary near San Luis, Arizona, 1.3 miles east of the Colorado River.

**RECORDS:** Main Drain discharges are lifted 10 to 12 feet at the pumping plant. Prior to April 1, 1969, discharges were computed from pump ratings and the differential head measured by the two gages. Beginning April 1, 1969 discharges were computed from flow meter charts. Pump ratings and flow meter discharges are checked by current meter measurements. Records obtained and computed by the United States Section of the Commission. Records available: Monthly discharges, June 1919 through 1951; daily discharges January 1952 through 1971.

**REMARKS:** Flows in the Main Drain are principally drainage waters from the Valley Division of the Yuma Project. Both the Main Drain and the East Main Canal Wasteway discharge into Mexico at the international land boundary near San Luis, Sonora. The water is used for irrigation in Mexico on the left (Sonora) bank of the Colorado River and is considered as part of the volumes arriving at the limitrophe section of the river.

## Mean Daily Discharge in Second Feet 1971 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	173	181	175	194	178	197	180	179	199	197	183	177
2	166	170	165	188	188	186	176	178	193	192	186	167
3	162	178	188	190	198	202	190	197	186	195	185	170
4	160	176	186	182	183	191	186	178	192	203	190	171
5	166	190	180	185	186	194	179	184	203	196	194	168
6	167	179	190	182	180	197	182	172	194	190	190	162
7	160	173	182	174	193	188	183	164	189	200	189	159
8	166	178	175	183	192	192	184	181	187	196	204	161
9	164	174	180	187	195	196	192	201	192	181	198	161
10	165	180	173	187	182	186	184	186	190	187	196	162
11	164	188	174	202	177	187	182	187	187	187	193	160
12	158	187	182	183	190	196	174	197	184	189	191	171
13	161	191	185	184	184	184	180	188	184	184	206	158
14	166	200	182	174	186	192	176	187	191	195	206	170
15	169	180	178	191	183	191	183	192	194	188	192	158
16	167	176	171	195	187	186	185	205	193	186	183	165
17	170	173	179	190	176	181	183	187	199	195	176	166
18	159	181	172	196	192	186	184	176	193	194	177	182
19	166	182	170	190	190	191	200	184	192	196	181	174
20	163	180	186	181	190	204	185	186	195	195	170	178
21	161	176	206	176	183	213	183	189	200	195	187	167
22	160	196	184	164	187	186	182	195	201	193	184	163
23	170	182	178	174	188	176	186	186	189	192	176	159
24	166	177	175	186	183	174	187	183	189	199	186	165
25	166	168	173	182	190	178	185	186	200	193	172	164
26	164	176	176	190	186	184	197	188	193	189	179	156
27	152	178	178	184	181	183	183	182	192	186	173	154
28	166	178	185	182	179	186	177	188	189	199	170	163
29	170	186	180	194	175	174	188	239	187	187	174	161
30	174	178	189	195	186	183	210	203	190	190	181	161
31	163	188	188	191	191	181	187	187	193	193	168	168
Sum	5,104	5,048	5,580	5,545	5,787	5,668	5,686	5,791	5,832	5,962	5,572	5,121
Current Year 1971												
Month	Extreme Gage Feet		Extreme Second Feet				Average Second Feet	Total Acre Feet	Period 1935-1971			
	High	Low	Day	High	Day	Low			Acre Feet			
Average							Maximum	Minimum				
Jan.			30	174	27	152	165	10,124	7,822	11,203	1,740	
Feb.			14	200	25	168	180	10,013	7,754	11,988	1,640	
Mar.			21	206	2	165	180	11,068	8,874	12,430	1,940	
Apr.			11	202	22	164	185	10,998	8,639	11,890	1,920	
May			3	198	17	176	187	11,478	8,794	13,140	1,950	
June			21	213	24	174	189	11,242	8,130	12,040	2,290	
July			19	200	112	174	183	11,278	7,919	11,830	2,530	
Aug.			30	210	7	164	187	11,486	7,848	11,960	2,560	
Sept.			29	239	112	184	194	11,568	7,883	11,568	2,280	
Oct.			4	203	9	181	192	11,825	8,920	12,385	2,940	
Nov.			113	206	120	170	186	11,052	8,660	12,010	2,800	
Dec.			18	182	27	154	165	10,157	8,357	11,480	2,450	
Yearly				239		152	183	132,289	99,600	139,380	27,040	

Ø Mean daily

† And other days

## WEST MAIN CANAL WASTEWAY (VALLEY DIVISION, YUMA PROJECT)

DESCRIPTION: Water-stage recorder located about 150 feet upstream from outlet to Yuma Main Drain, which is 175 feet upstream from East Main Canal Wasteway and 0.4 mile west of San Luis, Arizona.

RECORDS: Wasteway discharges computed by United States Section of the Commission beginning February 23, 1971, from water-stage recorder and ratings as determined by current meter measurements. Records available: March through December 1971.

REMARKS: Wasteway discharges from West Main Canal Wasteway comprise regulatory waste from the West Main Canal.

## Mean Daily Discharge in Second Feet 1971 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	1.7	2.9	0.8	0.5	0.1	0	0.6	20.7	8.1	6.5
2	0	0	3.3	1.2	6.4	1.0	0	1.2	8.5	9.4	9.8	2.1
3	0	0	2.8	.7	1.9	8.1	4.3	.9	.1	27.4	6.7	4.4
4	0	0	8.6	2.6	4.9	4.5	9.5	.6	2.4	22.5	4.6	3.4
5	0	0	7.6	.3	8.8	4.2	4.7	4.6	16.2	5.0	5.5	28.7
6	0	0	4.9	0	.2	26.9	.6	1.8	.5	.7	9.6	37.0
7	0	0	.6	0	.2	2.7	5.9	1.2	5.2	.2	11.4	3.7
8	0	0	1.1	0	6.6	0	.9	1.3	8.6	2.7	5.2	.6
9	0	0	.1	0	10.8	0	19.1	5.4	17.7	.1	4.6	.2
10	0	0	0	1.3	9.5	0	4.5	11.4	3.7	.1	12.0	3.4
11	0	0	0	3.2	4.2	0	1.0	14.2	.1	7.8	26.3	.6
12	0	0	.1	5.5	1.7	0	1.8	9.0	0	13.9	1.1	5.0
13	0	0	.5	.5	2.4	0	.5	1.7	1.5	17.8	6.0	5.8
14	0	0	8.6	2.3	2.9	14.9	5.1	.5	2.0	13.7	25.1	.6
15	0	0	17.3	* 3.0	.1	4.6	1.4	2.7	3.1	7.4	23.0	1.7
16	0	0	.3	* 1.7	.1	.1	.5	.2	4.2	7.8	2.6	9.7
17	0	0	0	2.4	4.6	0	.4	1.4	8.4	17.0	5.2	5.6
18	0	0	2.0	19.5	7.8	6.0	2.5	.2	.9	7.6	6.2	2.9
19	0	0	5.0	11.0	10.4	3.6	.5	1.7	.6	0	8.6	.4
20	0	0	.3	4.8	5.3	7.9	.4	7.0	16.7	0	11.7	2.5
21	0	0	1.1	1.5	1.6	17.2	.9	2.7	11.4	1.4	26.0	.6
22	0	0	1.1	7.3	.4	.2	2.4	3.0	.4	.7	6.5	5.3
23	0	.9	10.3	1.1	3.8	2.2	5.0	1.2	11.1	4.8	13.3	18.4
24	0	0	4.8	5.3	.2	.3	8.0	.5	.8	.9	.5	6.8
25	0	1.0	5.1	.1	.2	.3	22.9	.8	12.4	.7	2.4	4.0
26	0	1.7	5.8	2.4	.1	14.8	8.2	.5	12.4	4.6	1.7	3.5
27	0	.1	1.4	1.6	0	1.6	5.9	.2	9.3	4.8	11.0	2.4
28	0	0	.1	2.4	.2	6.0	1.4	.1	3.4	.4	4.6	2.6
29	0	0	6.5	1.7	1.2	22.7	3.4	6.7	17.3	5.0	3.2	7.6
30	0	0	.6	2.1	5.6	5.0	.2	.4	25.4	6.4	10.3	4.6
31	0	0	.6		6.7		0	.4		1.2		16.0
Sum	0	3.7	102.2	88.4	109.6	155.3	122.0	83.5	204.9	212.7	272.8	196.6
Current Year 1971												
Month	Extreme Gage Feet		Extreme Second Feet				Average Second Feet	Total Acre Feet	Period			
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum	
Jan.			26	1.7	†24	0		7.3				
Feb.			15	17.3	†10	0	3.3	203				
Mar.			18	19.5	†6	0	2.9	175				
Apr.			9	10.8	†27	0	3.5	217				
May			6	26.9	†3	0	5.2	303				
June			25	22.9	†2	0	3.9	242				
July			11	14.2	†1	0	2.7	166				
Aug.			30	25.4	†12	0	6.8	406				
Sept.			3	27.4	†19	0	6.9	422				
Oct.			11	26.3	†24	.5	9.1	541				
Nov.			6	37.0	†9	.2	6.3	390				
Dec.												
Yearly				37.0		0	5.1	3,077				

\* Partly estimated

† And other days

ø Mean daily



## TOTAL FLOWS CROSSING INTERNATIONAL BOUNDARY INTO MEXICO NEAR SAN LUIS, SONORA

**DESCRIPTION:** The tabulated data below are the combined flows of the East Main Canal Wasteway, Yuma Main Drain, and West Main Canal Wasteway (beginning February 23, 1971) and represent the total water crossing the international land boundary into the Sanchez Mejorada Canal near San Luis, Arizona. The Mexican Section maintains a water-stage recorder in Mexico on the right bank of Sanchez Mejorada Canal and obtains check measurements on a bridge located 0.2 mile downstream from the international boundary, 1.2 miles east of the Colorado River and 0.6 mile west of San Luis, Sonora.

**RECORDS:** Records obtained and computed by the United States Section of the Commission. Records available: January 1935 through 1971.

**REMARKS:** Descriptions and flows of the individual stations, East Main Canal Wasteway, Yuma Main Drain and West Main Canal Wasteway, are published separately in this bulletin on pages 30, 31, and 32.

### Mean Daily Discharge in Second Feet 1971 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	187	182	177	214	182	213	192	192	207	220	201	184
2	173	171	171	190	201	195	184	182	205	202	200	175
3	166	182	196	195	206	230	196	202	190	230	194	183
4	166	176	202	186	196	196	200	187	198	242	196	180
5	169	193	199	186	197	205	195	204	219	205	207	200
6	173	189	205	183	180	226	193	178	195	191	206	208
7	164	180	187	178	200	197	198	170	199	212	211	168
8	172	179	187	188	201	199	190	182	203	208	210	163
9	169	186	188	187	208	196	213	217	210	186	214	161
10	168	181	177	190	196	187	190	201	194	194	229	166
11	165	189	181	205	181	200	185	203	189	202	225	165
12	159	195	194	201	197	196	177	208	191	208	203	194
13	170	201	192	189	190	188	181	193	193	205	222	174
14	171	203	194	183	194	218	189	188	194	212	238	174
15	176	185	196	197	185	200	192	203	203	196	242	161
16	171	180	174	201	191	191	207	232	201	195	192	175
17	176	179	184	193	187	185	187	193	212	215	183	172
18	161	191	176	216	202	197	191	176	197	211	184	185
19	169	191	181	212	204	195	213	190	200	201	194	185
20	170	192	187	189	200	225	199	212	226	207	190	209
21	162	186	211	178	197	250	190	205	227	208	239	174
22	164	207	205	171	189	188	186	208	213	204	201	172
23	182	190	196	175	192	178	197	192	217	203	196	179
24	176	178	182	193	191	179	199	189	195	205	189	174
25	173	170	181	189	196	184	216	191	220	206	182	168
26	169	198	189	200	187	203	213	203	210	207	187	161
27	162	188	181	188	186	193	198	191	204	194	185	162
28	175	180	197	189	185	195	189	195	203	204	175	167
29	183		217	186	196	198	186	199	283	205	193	171
30	187		198	201	204	200	188	220	247	204	206	168
31	166		200		199		188	192		203		189
Sum	5,296	5,222	5,903	5,750	6,020	6,004	6,019	6,096	6,243	6,381	6,092	5,465
Current Year 1971												
Month	Extreme Gage Feet		Extreme Second Feet				Average Second Feet	Total Acre Feet	Period 1935-1971			
	High	Low	High		Low	Acre Feet	Acre Feet					
			Day	Day			Average		Maximum	Minimum		
Jan.			† 1	187	12	159	171	10,505	9,076	12,131	* 2,123	
Feb.			22	207	25	170	186	10,357	8,808	12,970	* 2,023	
Mar.			29	217	2	171	190	11,709	10,092	13,704	* 2,322	
Apr.			18	216	22	171	192	11,404	9,821	12,982	2,117	
May			9	208	6	180	194	11,940	10,093	13,900	2,473	
June			21	250	23	178	200	11,907	9,243	12,570	2,525	
July			25	216	12	177	194	11,939	9,120	12,420	2,927	
Aug.			16	232	7	170	197	12,090	9,069	12,657	2,939	
Sept.			29	283	11	189	208	12,383	9,001	12,450	2,602	
Oct.			4	242	9	186	206	12,657	10,096	13,398	3,444	
Nov.			15	242	29	173	203	12,084	9,955	12,712	3,407	
Dec.			20	209	† 9	161	176	10,839	9,622	12,050	2,888	
Yearly				283		161	193	139,814	113,996	149,010	31,840	

† Mean daily

Q Includes West Main Canal Wasteway

† And other days

\* Partly estimated

# COLORADO RIVER AT SOUTHERLY INTERNATIONAL BOUNDARY - DISCHARGES

**DESCRIPTION:** Water-stage recorder located in Mexico on the right bank of the river about 1,000 feet upstream from the southerly international boundary, 2 miles west of San Luis, Arizona, and 19.4 miles downstream from Morelos Dam. Zero of gage is at mean sea level, U. S. C. & G. S. datum.

**RECORDS:** Records obtained and furnished by the United States Section of the Commission. Computations by shifting control methods. Records available: Daily discharges, January 1950 through 1971; continuous record of gage heights, January 1947 through 1971. Monthly flows for this station have been derived for the period January 1935 through 1949 based on the computed records of monthly flows of the Colorado River at the northerly international boundary combined with the measured monthly flows from the wasteways discharging into the boundary section of the river from the Yuma Project in Arizona.

**REMARKS:** Reservoirs, diversions in the United States and Mexico, drainage returns, and waste flows modify the river flow at this station.

**EXTREMES:** Since January 1950: Maximum instantaneous discharge, 28,610 second-feet on December 18, 1952; maximum gage height, 84.84 feet on November 29, 1957. Minimum discharge, no flow on several occasions since September 1, 1956.

## Mean Daily Discharge in Second Feet 1971 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	147	259	39.7	* 2.4	41.5	93.9	0	0	79.0	489	245	247
2	148	259	25.0	1.9	70.8	79.2	0	0	65.0	916	242	247
3	148	257	20.6	* .9	78.0	75.6	0	0	64.0	771	242	249
4	147	252	18.4	.2	78.0	76.8	0	0	61.0	368	242	258
5	127	204	15.6	9.4	73.2	70.8	0	0	55.6	284	245	264
6	127	176	15.6	11.5	68.4	58.3	0	0	52.0	264	247	294
7	123	171	15.1	4.0	66.0	93.9	0	0	46.6	256	247	271
8	134	167	16.2	1.9	75.1	66.0	0	0	43.9	249	247	258
9	138	173	16.2	.4	* 92.6	58.3	0	0	46.6	245	247	253
10	147	167	12.9	0	* 95.2	54.0	0	0	43.9	240	245	234
11	176	157	12.4	0	* 92.6	48.4	0	0	38.5	240	245	207
12	211	152	11.8	* .8	93.9	48.4	0	0	39.4	238	245	191
13	240	142	11.8	* 2.5	96.5	46.4	0	0	50.2	234	247	159
14	245	126	11.2	0	96.5	46.4	15.5	0	64.0	232	256	139
15	257	177	31.1	3.3	100	47.4	46.4	0	70.0	230	296	128
16	257	134	22.5	2.4	* 95.2	41.5	59.4	0	77.0	230	269	118
17	259	115	12.6	2.6	* 102	27.8	66.0	0	143	232	253	110
18	262	103	* 9.1	2.1	* 95.2	29.2	68.4	0	168	238	253	101
19	262	79.2	* 7.2	2.2	96.5	28.5	68.4	0	186	245	256	98.1
20	259	70.8	7.6	1.1	92.6	11.8	38.7	.5	194	236	256	99.2
21	259	64.8	7.6	.5	90.0	7.6	14.4	25.4	200	238	253	97.0
22	259	54.0	9.8	0	88.8	47.8	6.5	98.1	200	238	251	100
23	257	39.7	9.1	0	90.0	8.0	5.8	192	200	240	247	101
24	259	35.3	6.8	0	90.0	0	5.3	230	200	245	245	100
25	267	40.8	5.6	0	93.9	0	3.4	251	204	245	245	99.2
26	257	44.1	5.1	0	95.2	0	0	288	204	238	247	99.2
27	259	41.9	6.1	0	92.6	0	0	330	202	240	251	96.1
28	259	44.1	5.3	0	92.6	0	0	330	204	240	253	102
29	262		5.8	0	96.5	0	0	352	213	238	249	107
30	259		5.3	5.6	97.8	0	0	294	260	240	247	107
31	264		3.1		97.8		0	115		242		102
Sum	6,675	3,705.7	402.2	55.7	2,725.0	1,166.0	398.2	2,506.0	3,674.7	9,081	7,513	5,037.8
Current Year 1971												
Period 1935-1971												
Month	Extreme Gage Feet		Extreme Second Feet				Average Second Feet	Total	Acre Feet			
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum	
Jan.	76.17	75.42	25	269	† 6	117	215	13,240	413,859	1,672,000	1,321	
Feb.	76.06	74.45	4	267	24	31.3	132	7,350	344,423	1,385,000	2,040	
Mar.	74.62	73.86	1	49.6	† 31	2.8	13.0	798	276,898	1,127,000	798	
Apr.	73.33	73.63	5	24.8	† 3	0	1.9	110	176,424	700,900	110	
May	74.93	74.19	17	105	† 1	23.2	87.9	5,405	242,550	1,160,000	1,045	
June	75.09	73.70	7	130	† 21	0	38.9	2,313	186,500	1,180,000	143	
July	74.57	73.70	† 18	69.6	† 1	0	12.8	790	136,191	772,800	0	
Aug.	76.18	73.60	30	366	† 1	0	80.8	4,971	151,764	795,000	0	
Sept.	75.90	74.24	30	304	† 11	37.6	122	7,289	184,310	1,033,000	0	
Oct.	77.84	75.64	2	961	† 16	228	293	18,012	235,691	1,192,000	9,120	
Nov.	76.05	75.72	15	312	† 1	242	250	14,902	309,962	1,428,000	7,180	
Dec.	76.05	74.80	6	315	† 21	97.0	163	9,992	390,535	1,839,000	2,320	
Yearly	77.84	73.60		961		0	118	85,172	3,049,107	10,688,800	83,792	

\* Partly estimated

" Estimated

† And other days

## COLORADO RIVER AT SOUTHERLY INTERNATIONAL BOUNDARY - STAGES

(See Preceding Page For Description)

Mean Daily Gage Height in Feet 1971

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	75.65	76.03	74.53	*73.86	74.43	74.82	73.70	73.60	74.68	76.52	75.73	75.75
2	75.65	76.03	74.36	*73.84	74.72	74.70	73.70	73.60	74.54	77.73	75.73	75.75
3	75.64	76.02	74.29	*73.81	74.78	74.67	73.70	73.60	74.53	77.39	75.73	75.76
4	75.62	76.00	74.25	73.79	74.78	74.69	73.70	73.60	74.50	76.25	75.74	*75.80
5	75.49	75.79	74.20	74.02	74.74	74.64	73.70	73.60	74.44	75.90	75.75	*75.83
6	75.49	75.63	74.20	74.13	74.70	74.53	73.70	73.60	74.40	75.81	75.76	*75.96
7	75.46	75.59	74.19	73.92	74.68	74.83	73.70	73.60	74.34	75.77	75.76	*75.86
8	75.54	75.59	74.21	73.81	74.73	74.60	73.70	73.60	74.31	75.74	75.76	75.80
9	75.56	75.58	74.21	73.67	*74.85	74.53	73.70	73.60	74.34	75.72	75.76	75.77
10	75.62	75.54	74.15	73.63	*74.87	74.49	73.70	73.60	74.31	75.70	75.75	75.68
11	75.79	75.48	74.14	73.63	*74.85	74.43	73.70	73.60	74.25	75.70	75.75	*75.54
12	75.96	75.45	74.13	*73.68	74.86	74.43	73.70	73.60	74.26	75.69	75.75	*75.46
13	76.09	75.39	74.13	*73.82	74.88	74.41	73.70	73.60	74.37	75.67	75.76	*75.28
14	76.11	75.28	74.12	73.63	74.88	74.41	73.93	73.60	74.52	75.66	75.80	*75.16
15	76.16	75.61	74.40	73.88	74.90	74.42	74.35	73.60	74.57	75.65	75.98	75.09
16	76.15	75.33	74.30	73.86	*74.86	74.35	74.48	73.60	74.63	75.65	75.86	75.00
17	76.15	75.19	74.15	73.83	*74.90	74.17	74.54	73.60	75.09	75.66	75.79	74.92
18	76.15	75.10	*74.08	73.84	*74.84	74.20	74.56	73.60	75.23	75.69	75.79	74.84
19	76.14	74.91	*74.03	73.85	74.85	74.19	74.56	73.60	75.33	75.72	75.80	74.81
20	76.13	74.84	74.04	73.75	74.82	73.95	74.25	73.62	75.38	75.68	75.80	74.82
21	76.12	74.78	74.04	73.69	74.80	73.84	73.94	74.11	75.42	75.69	75.79	74.80
22	76.11	74.68	74.10	73.63	74.79	74.41	73.79	74.81	75.42	75.69	75.78	74.83
23	76.09	74.53	74.08	73.63	74.80	73.88	73.78	75.38	75.42	75.70	75.76	74.84
24	76.09	74.49	74.02	73.63	74.80	73.70	73.76	75.56	75.42	75.72	75.75	74.83
25	76.11	74.54	73.98	73.63	74.82	73.70	73.70	75.66	75.44	75.72	75.75	74.82
26	76.06	74.57	73.96	73.63	74.83	73.70	73.60	75.83	75.44	75.70	75.76	74.82
27	76.06	74.55	74.00	73.63	74.81	73.70	73.60	76.02	75.43	75.71	75.78	74.81
28	76.05	74.57	73.97	73.63	74.81	73.70	73.60	76.02	75.44	75.71	75.79	74.85
29	76.05		73.99	73.63	74.84	73.70	73.60	76.12	75.48	75.70	75.77	74.89
30	76.04		73.97	73.83	74.85	73.70	73.60	75.85	75.70	75.71	75.76	74.89
31	76.05		73.88		74.85		73.60	74.96		75.72		74.85
Avg.	75.92	75.25	74.13	73.76	74.80	74.25	73.85	74.27	74.89	75.87	75.77	75.23

\* Partly estimated

\* Estimated

## WASTEWAY TO COLORADO RIVER AT KILOMETER 27 IN MEXICO

**DESCRIPTION:** Water-stage recorder and cableway located on the left bank of the canal wasteway immediately upstream from where it discharges into the Colorado River, 0.6 mile downstream from the wasteway gates on Canal de Conexion, 16.8 miles downstream from Morelos Dam, and 0.2 mile south of the junction of the Mexicali-San Luis and Algodones-Pescaderos highways.

**RECORDS:** Data obtained and computed by the Colorado River Irrigation District of the Ministry of Hydraulic Resources and furnished by the Mexican Section of the Commission. Records shown in table below are waste returns to the Colorado River. 1971 records good. Records available: April 1956 through 1971.

**REMARKS:** The Colorado River Irrigation District transports water for irrigation of land on the left bank of the Colorado River by the Canal de Conexion to a point called Kilometer 27. At this point, flows may be returned to the river through the wasteway or diverted to the Bacanora-Monumentos Canal system through the Sanchez Mejorada Siphon, which was placed in operation on June 28, 1963.

### Monthly Discharge in Acre-Feet

Month	Current Year 1971	Period 1956-1971		
		Average	Maximum	Minimum
January	0	6,253	69,527	0
February	0	1,257	8,679	0
March	0	7,278	35,492	0
April	0	16,542	68,714	0
May	0	7,137	22,072	0
June	0	11,397	28,915	0
July	0	17,879	46,139	0
August	0	19,318	55,497	0
September	0	11,656	37,194	0
October	0	4,219	20,512	0
November	0	9,904	69,415	0
December	0	6,285	70,213	0
Yearly	0	112,124	346,339	0

**WASTEWAY TO COLORADO RIVER AT COLONIA ELIAS IN MEXICO**

**DESCRIPTION:** Wasteway structure located at Kilometer 7+570 of the Barrote Canal on the right bank of the Colorado River in Colonia Elias about 20.5 miles downstream from the southerly international boundary and the town of San Luis Rio Colorado, Sonora; about 10 miles upstream from the Sonora-Baja California railroad bridge and 4.3 miles upstream from the Miguel C. Rodriguez Gaging Station. The wasteway gates are located about 2,500 feet from the right bank of the Colorado River.

**RECORDS:** Data obtained by the Ministry of Hydraulic Resources and furnished by the Mexican Section of the Commission are based on gate openings. Records available: January 1957 through 1971.

**REMARKS:** The wasteway structure has 3 manually operated rectangular gates which discharge directly from the Barrote Canal into a wasteway leading to the Colorado River.

**Monthly Discharge in Acre-Feet**

Month	Current Year 1971	Period 1957-1971		
		Average	Maximum	Minimum
January	0	526	3,201	0
February	0	347	4,097	0
March	0	554	6,850	0
April	0	427	3,707	0
May	0	97.3	1,163	0
June	0	50.5	625	0
July	0	286	4,296	0
August	0	275	1,926	0
September	0	332	1,548	0
October	0	99.7	791	0
November	0	238	1,891	0
December	0	293	3,047	0
Yearly	0	3,526	13,429	0

# COLORADO RIVER AT MIGUEL C. RODRIGUEZ IN MEXICO - DISCHARGES

**DESCRIPTION:** Water-stage recorder and cableway located in Mexico on the left bank of the Colorado River about 24.5 miles downstream from the southerly international boundary, 44.5 miles downstream from Morelos Dam and 4.5 miles upstream from the Sonora-Baja California railroad bridge. Zero of gage is at mean sea level, U. S. C. & G. S. datum.

**RECORDS:** Based on current meter measurements made during the year and a continuous record of gage heights. Data obtained and furnished by the Mexican Section of the Commission. From June 1951 to July 1954, discharges were computed from gage height records based on daily gage readings at 8:00 a. m., Pacific Standard Time. A continuous record of gage heights obtained since July 21, 1954. Records available: June 1951 through 1971.

**REMARKS:** Diversions and return flows modify the flow of the river at this station. On many occasions the flow at this station consists solely of seepage from canals which run parallel and adjacent to the river at a higher elevation.

**EXTREMES:** Since January 1, 1952: Maximum mean daily gage height, 53.28 feet on January 4, 1958 with a discharge of 18,500 second-feet; minimum mean daily gage height, 37.73 feet on July 18, 1970 with a discharge of 2.8 second-feet; maximum mean daily discharge, 20,200 second-feet on December 19, 1952 with a gage height of 52.30 feet; minimum mean daily discharge, no flow on various occasions.

## Mean Daily Discharge in Second Feet 1971 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	52.3	137	7.1	7.8	7.4	6.7	5.7	6.4	4.9	4.9	79.1	114
2	55.1	135	7.1	7.8	7.4	6.7	5.7	6.4	4.9	4.2	79.1	112
3	55.1	137	7.1	8.1	7.4	6.7	6.0	6.0	4.6	14.8	81.9	111
4	53.3	137	7.1	8.1	7.4	6.7	6.0	6.0	4.6	86.5	85.5	114
5	55.1	138	7.1	8.5	7.4	6.7	6.4	5.7	4.6	113	86.9	114
6	52.3	117	7.1	8.5	7.4	6.7	6.4	5.7	4.6	68.2	88.6	119
7	48.7	91.8	7.1	8.5	7.4	6.7	6.4	5.3	4.6	50.9	90.4	123
8	48.7	77.7	7.1	8.5	7.4	6.7	6.4	5.3	4.2	46.3	88.6	128
9	50.1	74.9	7.1	8.5	7.4	6.4	6.4	4.9	4.2	45.2	88.6	121
10	53.3	73.5	7.4	8.5	7.4	6.4	6.4	4.9	4.2	44.5	90.4	119
11	56.2	69.2	7.4	8.8	7.4	6.4	6.4	4.9	4.2	42.4	90.4	112
12	66.4	65.0	7.4	8.8	7.1	6.4	6.0	4.9	3.9	43.4	88.6	98.2
13	78.0	60.7	7.4	8.8	7.1	6.0	6.0	5.3	3.9	47.0	86.9	85.5
14	93.9	57.9	7.8	8.8	7.1	6.0	6.0	5.3	3.9	48.0	92.5	72.0
15	106	48.4	7.8	8.8	7.1	6.0	6.0	5.3	4.2	47.0	94.6	56.2
16	115	60.7	7.8	8.5	6.7	6.0	6.0	5.3	4.6	45.2	107	42.7
17	123	57.9	7.4	8.5	6.7	6.0	6.0	5.3	4.6	45.2	113	34.6
18	126	42.0	7.4	8.1	6.7	6.0	6.0	5.3	4.6	47.0	110	29.0
19	129	33.2	7.1	7.8	6.7	6.0	6.0	5.3	4.9	48.7	104	22.2
20	131	25.8	7.1	7.8	6.7	6.0	6.0	5.7	4.9	52.6	107	18.4
21	131	20.1	6.7	7.8	7.1	6.0	6.0	5.7	4.6	54.7	107	17.7
22	133	16.2	6.7	7.8	7.1	6.0	6.0	5.7	4.6	54.7	113	16.2
23	121	11.3	6.7	7.8	7.1	5.7	6.0	5.7	4.2	55.8	116	14.5
24	131	8.5	6.7	7.8	7.1	5.7	6.0	5.7	4.2	59.3	116	14.5
25	133	7.4	6.7	7.8	7.1	5.3	6.0	5.3	3.9	60.4	113	13.8
26	139	7.4	7.1	7.4	7.1	5.3	6.0	5.3	3.9	62.2	113	12.7
27	139	7.4	7.1	7.4	7.1	4.9	6.0	5.3	3.5	63.2	116	11.3
28	138	7.4	7.1	7.4	6.7	4.9	6.0	5.3	3.9	64.3	116	11.3
29	136	7.1	7.1	7.4	6.7	5.3	6.0	4.9	4.6	63.2	126	11.3
30	133	7.4	7.4	7.4	6.7	5.3	6.4	4.9	4.9	63.2	126	13.8
31	135	7.4	7.4	7.4	6.7	6.7	6.4	4.9	4.9	66.7	126	15.5
Sum	3,017.6	1,724.8	222.1	243.3	219.7	181.5	188.6	167.7	131.4	1,612.8	3,015.2	1,898.5

Month	Current Year 1971						Period 1951-1971			
	Extreme Gage Feet		Extreme Second Feet			Average Second Feet	Total Acre Feet	Acre Feet		
	High	Low	Day	High	Low			Average	Maximum	Minimum
Jan.	41.34	39.07	26	141	7	47.7	97.5	241,078	1,047,732	426
Feb.	41.34	38.09	5	140	25	7.4	61.4	151,772	696,461	317
Mar.	38.12	38.06	14	7.8	21	6.7	7.1	440	106,748	807,342
Apr.	38.32	38.06	11	8.8	126	7.4	8.1	482	70,074	588,983
May	38.12	38.09	1	7.4	116	6.7	7.1	435	97,586	732,815
June	38.12	38.06	1	6.7	127	4.9	6.0	360	42,427	555,460
July	38.32	38.12	1	6.4	1	5.7	6.0	374	22,819	264,561
Aug.	39.50	38.32	1	6.4	1	4.9	5.3	332	33,833	309,320
Sept.	39.55	38.48	1	4.9	127	3.5	4.2	260	52,875	572,551
Oct.	41.90	38.52	5	113	2	4.2	51.9	3,199	87,152	769,939
Nov.	41.60	40.94	29	132	1	79.1	101	5,981	145,052	909,399
Dec.	41.80	38.52	8	133	27	11.3	61.1	3,766	195,701	1,060,767
Yearly	41.90	38.06		141		3.5	34.6	25,036	1,211,241	7,923,600

† And other days

## COLORADO RIVER AT MIGUEL C. RODRIGUEZ IN MEXICO - STAGES

(See Preceding Page For Description)

Mean Daily Gage Height in Feet 1971

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	39.21	41.27	38.09	38.06	38.09	38.09	38.12	38.32	38.55	38.55	40.94	41.54
2	39.30	41.24	38.09	38.06	38.09	38.09	38.12	38.32	38.55	38.52	40.94	41.50
3	39.30	41.27	38.09	38.06	38.09	38.09	38.16	38.32	38.55	39.01	41.01	41.47
4	39.24	41.27	38.09	38.06	38.09	38.09	38.19	38.35	38.55	41.40	41.08	41.54
5	39.30	41.31	38.09	38.06	38.09	38.09	38.19	38.35	38.55	41.90	41.11	41.54
6	39.21	40.85	38.09	38.09	38.09	38.09	38.22	38.39	38.48	40.94	41.14	41.60
7	39.11	40.29	38.09	38.09	38.09	38.09	38.22	38.39	38.48	40.42	41.17	41.67
8	39.11	39.96	38.09	38.22	38.09	38.09	38.22	38.39	38.48	40.26	41.14	41.73
9	39.14	39.90	38.09	38.12	38.09	38.09	38.25	38.42	38.48	40.22	41.14	41.63
10	39.24	39.86	38.09	38.09	38.09	38.09	38.25	38.42	38.48	40.19	41.17	41.60
11	39.34	39.76	38.09	38.06	38.09	38.09	38.25	38.45	38.48	40.12	41.17	41.50
12	39.63	39.67	38.09	38.06	38.09	38.09	38.25	38.48	38.48	40.16	41.14	41.24
13	39.96	39.57	38.09	38.06	38.09	38.06	38.29	38.48	38.48	40.29	41.11	40.98
14	40.35	39.50	38.09	38.09	38.09	38.06	38.29	38.48	38.48	40.32	41.21	40.62
15	40.62	39.27	38.06	38.09	38.12	38.06	38.29	38.48	38.48	40.29	41.24	40.16
16	40.81	39.57	38.06	38.09	38.12	38.06	38.29	38.48	38.48	40.22	41.40	39.73
17	40.98	39.50	38.06	38.09	38.12	38.06	38.29	38.48	38.48	40.22	41.47	39.44
18	41.04	39.11	38.06	38.09	38.12	38.06	38.29	38.48	38.48	40.29	41.44	39.24
19	41.11	38.88	38.06	38.09	38.12	38.06	38.29	38.52	38.48	40.35	41.37	38.98
20	41.14	38.68	38.06	38.09	38.12	38.09	38.29	38.55	38.48	40.49	41.40	38.81
21	41.14	38.52	38.06	38.09	38.12	38.09	38.29	38.91	38.48	40.55	41.40	38.78
22	41.17	38.39	38.06	38.06	38.12	38.09	38.29	39.21	38.48	40.55	41.47	38.71
23	40.94	38.22	38.06	38.06	38.12	38.09	38.29	38.91	38.48	40.58	41.50	38.65
24	41.14	38.12	38.06	38.06	38.12	38.09	38.29	38.88	38.48	40.68	41.50	38.65
25	41.17	38.09	38.06	38.06	38.12	38.09	38.29	38.88	38.48	40.72	41.47	38.62
26	41.31	38.09	38.06	38.06	38.09	38.12	38.29	38.71	38.48	40.78	41.47	38.58
27	41.31	38.09	38.06	38.06	38.09	38.12	38.29	38.65	38.48	40.81	41.50	38.52
28	41.27	38.09	38.06	38.06	38.09	38.09	38.29	38.62	38.48	40.85	41.50	38.52
29	41.24		38.06	38.06	38.09	38.09	38.29	38.58	38.52	40.81	41.57	38.52
30	41.17		38.06	38.06	38.09	38.12	38.29	38.58	38.55	40.81	41.57	38.62
31	41.21		38.06	38.09	38.09		38.32	38.55		40.91		38.68
Avg.	40.32	39.50	38.06	38.09	38.09	38.09	38.25	38.55	38.48	40.39	41.31	40.06

## WASTEWAY TO COLORADO RIVER AT UNION IN MEXICO

**DESCRIPTION:** Wasteway structure located at Kilometer 21+736 of the Barrote Canal in the Colonia Hidalgo about 1,500 feet from right bank of the Colorado River. The wasteway discharges into the Colorado River at a point about 0.6 mile upstream from the Sonora-Baja California railroad bridge and 30 miles downstream from the southerly international boundary.

**RECORDS:** Data obtained by the Ministry of Hydraulic Resources and furnished by the Mexican Section of the Commission are based on gate openings. Records available: January 1957 through 1971.

**REMARKS:** The wasteway structure has 3 manually operated rectangular gates which discharge from the Barrote Canal into a wasteway leading to the Colorado River.

### Monthly Discharge in Acre-Feet

Month	Current Year 1971	Period 1957-1971		
		Average	Maximum	Minimum
January	0	795	3,166	0
February	0	432	2,788	0
March	0	1,075	7,074	0
April	0	783	4,462	0
May	0	967	4,413	0
June	0	201	1,505	0
July	0	438	4,296	0
August	0	233	1,857	0
September	0	329	1,800	0
October	0	717	6,997	0
November	0	230	3,413	0
December	0	268	1,205	0
Yearly	0	6,469	24,526	0



## COLORADO RIVER AT EL MARITIMO IN MEXICO - STAGES

**DESCRIPTION:** Water-stage recorder and cableway in Mexico, 47.6 miles downstream from the southerly international boundary, 18.6 miles downstream from the Sonora-Baja California railroad bridge and 3.7 miles east of Kilometer 70 of the Mexicali-San Felipe highway. The recorder is located on the right bank of the Colorado River. Zero of gage is 9.84 feet above mean sea level, U. S. C. & G. S. datum.

**RECORDS:** Records obtained and computed by the Mexican Section of the Commission. Records available: Mean daily discharges from January 1960 through 1968. Incomplete record of gage heights, March 1, 1946 through November 1947; twice daily readings of gage heights, January 1, 1948 through December 1949; continuous record of gage heights since installation of water-stage recorder February 6, 1956. Mean daily gage heights, January 1960 through 1971.

**REMARKS:** In former years the flow past this station was affected by the tides in the Gulf of California. After July 1968, measurement by current meter was suspended; beginning in 1969, twice daily readings of gage heights and no record of mean daily discharges.

**EXTREMES:** January 1960 through 1968: Maximum daily discharge, 4,410 second-feet, January 21 and December 7 and 8, 1960; minimum discharge, no flow on various occasions. Maximum monthly discharge, 225,224 acre-feet, January 1960; minimum monthly discharge, zero during various months of several years. Annual maximum discharge, 503,260 acre-feet during 1960; minimum 59,335 acre-feet in 1968. January 1960 through 1971: Maximum instantaneous gage height, 18.73 feet on January 21, 1960; minimum gage height, 12.47 feet on August 31 and September 1, 1960.

Mean Daily Gage Height in Feet 1971

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	14.76	14.90	14.80	14.73	14.90	14.63	14.30	14.17	14.34	14.24	14.44	14.80
2	14.76	14.93	14.76	14.73	14.90	14.63	14.30	14.17	14.34	14.24	14.44	14.80
3	14.73	14.93	14.76	14.73	14.86	14.60	14.30	14.17	14.34	14.24	14.44	14.83
4	14.70	14.93	14.76	14.70	14.86	14.57	14.27	14.17	14.34	14.21	14.47	14.80
5	14.70	14.93	14.76	14.70	14.86	14.57	14.30	14.24	14.30	14.21	14.50	14.80
6	14.70	14.93	14.73	14.73	14.83	14.57	14.34	14.24	14.30	14.21	14.53	14.83
7	14.73	14.93	14.73	14.73	14.83	14.57	14.34	14.21	14.30	14.21	14.53	14.80
8	14.76	14.93	14.76	14.73	14.83	14.53	14.34	14.17	14.30	14.24	14.57	14.76
9	14.76	14.93	14.76	14.73	14.83	14.53	14.30	14.21	14.30	14.24	14.57	14.83
10	14.76	14.93	14.80	14.73	14.83	14.53	14.30	14.21	14.30	14.24	14.57	14.83
11	14.73	14.93	14.76	14.73	14.83	14.53	14.30	14.24	14.30	14.24	14.60	14.83
12	14.73	14.93	14.80	14.73	14.80	14.83	14.30	14.27	14.27	14.27	14.60	14.83
13	14.73	14.93	14.76	14.76	14.80	14.83	14.30	14.27	14.27	14.27	14.63	14.83
14	14.76	14.93	14.76	14.76	14.90	14.83	14.30	14.30	14.27	14.27	14.63	14.86
15	14.76	14.93	14.76	14.76	14.86	14.83	14.27	14.27	14.27	14.27	14.67	14.86
16	14.76	14.93	14.76	14.80	14.86	14.83	14.27	14.27	14.27	14.21	14.63	14.86
17	14.80	14.93	14.76	14.76	14.70	14.80	14.27	14.30	14.27	14.24	14.63	14.83
18	14.80	14.93	14.73	14.76	14.70	14.80	14.27	14.30	14.21	14.24	14.67	14.83
19	14.80	14.90	14.73	14.80	14.70	14.80	14.24	14.30	14.21	14.27	14.67	14.83
20	14.83	14.86	14.73	14.80	14.70	14.44	14.24	14.30	14.21	14.27	14.67	14.83
21	14.83	14.86	14.76	14.76	14.70	14.47	14.21	14.34	14.21	14.30	14.70	14.83
22	14.86	14.86	14.76	14.80	14.70	14.44	14.21	14.34	14.21	14.30	14.70	14.83
23	14.86	14.86	14.76	14.83	14.70	14.44	14.21	14.34	14.17	14.34	14.70	14.83
24	14.86	14.83	14.76	14.80	14.70	14.44	14.17	14.34	14.17	14.34	14.73	14.83
25	14.86	14.86	14.76	14.80	14.70	14.44	14.17	14.34	14.17	14.34	14.76	14.83
26	14.86	14.80	14.76	14.83	14.67	14.40	14.14	14.34	14.17	14.37	14.76	14.83
27	14.86	14.80	14.76	14.83	14.67	14.40	14.14	14.34	14.17	14.37	14.76	14.83
28	14.90	14.80	14.76	14.86	14.63	14.40	14.11	14.34	14.17	14.40	14.80	14.83
29	14.90		14.73	14.86	14.63	14.37	14.11	14.34	14.17	14.40	14.80	14.80
30	14.90		14.76	14.86	14.63	14.30	14.11	14.30	14.24	14.40	14.80	14.80
31	14.90		14.76		14.63		14.11	14.30		14.44		14.76
Avg.	14.80	14.90	14.76	14.76	14.76	14.57	14.24	14.27	14.24	14.27	14.63	14.83

## STORED WATER IN LARGE RESERVOIRS OF THE COLORADO RIVER

Data are presented below for all large storage reservoirs in the Colorado River basin below Lee's Ferry, all of which are located in the United States. The monthly figures represent usable contents on the last day of the month, in thousands of acre-feet. The capacities indicated are usable capacities at the top of the spillway gates in closed position, for those dams having controlled spillways; for all others, capacities indicated are at spillway level. Records furnished by the U. S. Geological Survey.

### In Thousands of Acre-Feet

Month	LAKE MEAD (Capacity 26,159.0)		LAKE MOHAVE (Capacity 1,810.0)		HAVASU LAKE (Capacity 619.4)		TOTAL IN UNITED STATES RESERVOIRS (Capacity 28,588.4)	
	1971	Average 1935-1971	1971	Average 1951-1971	1971	Average 1939-1971	1971	Estimated Average
Jan.	16,801.0	16,464.8	1,624.0	1,652.7	546.7	556.0	18,971.7	18,673.5
Feb.	16,523.0	16,155.2	1,700.0	1,675.2	547.0	559.7	18,770.0	18,390.1
Mar.	16,289.0	15,860.9	1,666.0	1,674.9	564.0	574.2	18,519.0	18,110.0
Apr.	16,326.0	16,029.2	1,706.0	1,693.8	597.4	603.8	18,629.4	18,326.8
May	16,374.0	17,132.2	1,785.0	1,743.6	612.0	602.2	18,771.0	19,478.0
June	16,462.0	18,652.7	1,690.0	1,624.8	609.6	605.5	18,761.6	20,883.0
July	16,615.0	18,865.6	1,475.0	1,488.9	597.8	593.6	18,687.8	20,948.1
Aug.	16,799.0	18,598.5	1,487.0	1,411.7	579.2	576.2	18,865.2	20,586.4
Sept.	16,886.0	18,248.4	1,441.0	1,400.4	574.3	571.1	18,901.3	20,219.9
Oct.	16,976.0	17,934.6	1,441.0	1,418.7	563.3	574.9	18,980.3	19,928.2
Nov.	17,258.0	17,654.1	1,447.0	1,500.4	553.5	563.4	19,258.5	19,717.9
Dec.	17,645.0	17,327.7	1,538.0	1,604.7	541.8	558.2	19,724.8	19,490.6
Avg.	16,746.2	17,410.3	1,583.3	1,574.2	573.9	578.2	18,903.4	19,562.7
Max.	17,645.0	27,780.0	1,785.0	1,808.0	612.0	608.7	19,724.8	28,235.0
Min.	16,289.0	* 10,727.0	1,441.0	1,186.0	541.8	76.9	18,519.0	13,062.6

\* Minimum since 1940

## SUSPENDED SILT

The following tables are based on determinations of gravimetric percentages of dry silt in water samples taken at each station by one of the following methods:

A. By lowering a D-43 depth integrating sampler at verticals located at centers of sections of equal discharge in the river cross section, being careful to approach but not strike the bottom. The samples obtained in the section are combined to comprise a composite sample for that date.

B. By lowering a D-43 depth integrating sampler at verticals located at centers of each span of the service bridge across the Alamo Canal, being careful to approach but not strike the bottom. The samples obtained in the section are combined to comprise a composite sample for that date.

C. By sampling at the stream surface with a separate bottle at each of three points, spaced 1/6, 1/2, and 5/6 of the stream width. The gravimetric percentage in each sample is determined, a coefficient of 1.10 is applied to the average of the three, and the product applied to the volume of the stream flow represented by that set of samples.

For ease of comparison, the assumption is made that 1,847 tons of deposited silt would occupy a volume of one acre-foot, or one cubic foot of deposited silt would weigh 85 pounds.

Month	1971						Period of Record		
	Tons		No. of Samples	Gravimetric Percentages			Acre-Feet at 1,847 Tons Per Acre Foot		
	Water	Silt		Average	Maximum Sample	Minimum Sample	Average	Maximum	Minimum

### Colorado River at Northerly International Boundary

Period 1956-1971

Jan.	95,578,000	5,600	4	0.0058	0.0129	0.0035	3.0	35.9	336	1.6
Feb.	121,461,000	7,100	4	.0058	.0090	.0048	3.8	16.3	116	1.6
Mar.	259,014,000	28,600	5	.0110	.0123	.0096	15.5	52.4	499	8.8
Apr.	238,042,000	17,500	4	.0073	.0100	.0032	9.5	47.9	434	9.4
May	98,199,000	4,200	4	.0043	.0071	.0030	2.3	17.7	201	2.3
June	166,585,000	13,300	5	.0080	.0141	.0057	7.2	17.4	92.6	4.9
July	239,418,000	16,100	4	.0067	.0081	.0057	8.7	24.1	89.3	7.4
Aug.	222,139,000	29,200	5	.0131	.0362	.0062	15.8	23.1	103	6.2
Sept.	84,996,000	7,100	6	.0083	.0355	.0026	3.8	10.1	43.6	2.3
Oct.	62,283,000	3,200	5	.0051	.0107	.0021	1.7	4.7	20.0	.8
Nov.	56,267,000	1,000	4	.0018	.0020	.0017	.5	13.0	89.9	.5
Dec.	144,719,000	6,000	5	.0041	.0052	.0016	3.2	25.0	174	.6
Yearly	1,788,706,000	138,900	55	0.0078	0.0862	0.0016	75.0	288	2,198	64.6

Samples by U. S. Section, and analyses by United States Bureau of Reclamation, Method A

### Intake Canal at Morelos Diversion Structure

Period 1952-1971

Jan.	95,297,000	3,093	4	0.0032	0.0053	0.0023	1.7	5.7	22.3	0.2
Feb.	120,983,000	10,185	4	.0034	.0222	.0026	5.5	6.0	19.4	.9
Mar.	258,461,000	43,709	4	.0169	.0337	.0119	23.6	48.2	154	11.1
Apr.	237,537,000	33,957	5	.0143	.0196	.0071	18.3	43.5	121	13.2
May	97,773,000	6,958	4	.0071	.0089	.0058	3.7	11.8	51.2	1.5
June	166,003,000	10,475	4	.0063	.0071	.0055	5.7	33.8	109	4.7
July	238,976,000	15,561	5	.0065	.0077	.0052	8.4	49.0	156	8.3
Aug.	218,213,000	15,137	7	.0070	.0237	.0041	8.2	45.1	135	7.5
Sept.	82,477,000	8,615	5	.0104	.0334	.0059	4.6	15.6	64.7	1.9
Oct.	56,439,000	5,984	5	.0106	.0401	.0063	3.2	4.4	12.0	.3
Nov.	56,087,000	3,800	4	.0068	.0077	.0060	2.0	2.3	9.3	.2
Dec.	144,412,000	11,854	5	.0088	.0099	.0069	6.4	4.9	14.8	1.1
Yearly	1,770,656,000	159,328	56	0.0088	0.0401	0.0023	91.4	273	696	68.4

Samples and analyses by Mexican Section, Method B

## SUSPENDED SILT

Month	1971						Period of Record		
	Tons		No. of Samples	Gravimetric Percentages			Acre-Feet at 1,847 Tons Per Acre Foot		
	Water	Silt		Average	Maximum Sample	Minimum Sample	Average	Maximum	Minimum

## Colorado River at Southerly International Boundary

Period 1946-1971

Jan.	17,993,000	600	4	0.0033	0.0046	0.0018	0.3		
Feb.	9,989,000	500	4	.0050	.0061	.0030	.3		
Mar.	1,084,000	40	4	.0037	.0048	.0030	0		
Apr.	149,000	0	2	.0034	.0040	.0030	0		
May	7,345,000	800	4	.0109	.0131	.0048	.4		
June	3,143,000	300	3	.0095	.0129	.0065	.2		
July	1,074,000	60	1	.0056	.0060	.0050	0		
Aug.	6,756,000	700	2	.0103	.0115	.0088	.4		
Sept.	9,906,000	600	4	.0060	.0085	.0053	.3		
Oct.	24,478,000	1,500	2	.0061	.0066	.0056	.8		
Nov.	20,252,000	1,500	0	* .0074	* .0079	* .0067	.8		
Dec.	13,579,000	1,100	3	.0081	.0102	.0077	.6		
Yearly	115,748,000	7,700	33	0.0066	0.0131	0.0018	4.1		

Samples and analyses by U. S. and Mexican Sections, Method A

\* Estimated

## Colorado River at Miguel C. Rodriguez Gaging Station

Period 1960-1971

Jan.	8,138,000	568	4	0.0070	0.0134	0.0016	0.3	23.5	251	0
Feb.	4,652,000	390	4	.0084	.0141	.0050	.2	3.5	13.9	0
Mar.	599,000	55.1	5	.0092	.0111	.0051	0	.6	4.1	0
Apr.	656,000	52.9	4	.0080	.0168	.0039	0	.2	1.0	0
May	592,000	35.3	5	.0060	.0129	.0020	0	.2	1.5	0
June	489,000	38.6	4	.0080	.0126	.0069	0	.4	.1	0
July	508,000	29.8	3	.0058	.0073	.0039	0	0	.2	0
Aug.	452,000	36.4	5	.0080	.0113	.0049	0	0	.2	0
Sept.	354,000	29.8	5	.0083	.0152	.0062	0	.1	4.5	0
Oct.	4,350,000	651	12	.0150	.0281	.0079	.3	.4	20.7	.1
Nov.	8,132,000	563	5	.0094	.0109	.0073	.4	2.5	35.8	.2
Dec.	5,120,000	599	4	.0117	.0138	.0069	.3	4.1	12.9	0
Yearly	34,042,000	3,049	60	0.0087	0.0281	0.0016	1.6	39.2	289	1.6

Samples and analyses by Mexican Section, Method C

## CHEMICAL ANALYSES OF WATER SAMPLES

1971

The tables below are based on chemical analyses of weekly samples from the Colorado River at the Northernly International Boundary taken by the United States Section of this Commission and analyzed by the U. S. Geological Survey. Samples from the Intake Canal at Morelos Diversion Structure were taken by the Mexican Section of the Commission and analyzed by the Ministry of Hydraulic Resources.

To convert milligram equivalents to parts per million by weight, multiply each ion by its appropriate conversion factor. These factors are: Ca, 20.04; Mg, 12.16; Na, 22.99; (CO<sub>3</sub> plus HCO<sub>3</sub>) expressed as CO<sub>3</sub>, 30.00; SO<sub>4</sub>, 48.03; Cl, 35.45; NO<sub>3</sub>, 62.00. To convert tons per acre-foot to parts per million, multiply tons per acre-foot by 735.5. Electrical conductivity, reported in the tables as ECx10<sup>6</sup> at 25°C, is a relative measure of the total salt concentration.

Month	No. of Samples	Dissolved Solids		ECx10 <sup>6</sup> @25°C	Boron p. p. m.	pH	% Na	% Cl	Mean Milligram Equivalents per Liter						
		Tons Per Acre-Foot	Total Tons						Ca	Mg	Na	CO <sub>3</sub> + HCO <sub>3</sub>	SO <sub>4</sub>	Cl	NO <sub>3</sub>

## Colorado River at Northernly International Boundary

Jan.	4	1.59	112,000	1,960		8.1	52	36	5.92	3.47	10.30	3.53	9.05	7.11	
Feb.	4	1.59	142,000	1,930		8.1	52	36	5.87	3.43	9.92	3.47	8.85	6.90	
Mar.	5	1.59	303,000	1,950		8.2	52	37	5.88	3.46	9.98	3.39	8.84	7.08	
Apr.	4	1.54	269,000	1,880		8.2	50	35	5.81	3.49	9.38	3.32	8.75	6.62	
May	4	1.63	113,000	1,980		8.1	52	35	6.05	3.57	10.36	3.57	9.35	7.06	
June	5	1.61	197,000	1,900		8.2	51	35	5.81	3.44	9.74	3.41	8.91	6.67	
July	4	1.58	279,000	1,910		8.2	52	37	5.76	3.44	9.98	3.29	8.86	7.03	
Aug.	5	1.54	252,000	1,900		8.1	52	37	5.72	3.34	9.98	3.28	8.80	6.96	
Sept.	4	1.58	98,800	1,960		8.1	53	36	5.84	3.49	10.34	3.50	9.04	7.12	
Oct.	4	1.50	68,800	1,840		8.0	50	35	5.80	3.55	9.42	3.62	8.61	6.54	
Nov.	5	1.56	64,700	1,850		8.0	49	35	5.92	3.57	9.27	3.76	8.41	6.59	
Dec.	4	1.65	176,000	2,030		8.1	52	39	5.90	3.91	10.79	3.65	8.93	8.03	
Mean	4.52	1.58	2,080,300	1,930		8.1	51	36	5.84	3.49	9.95	3.42	8.87	6.99	
Period Avg.	1.73		2,576,000	2,110		7.9			6.22	3.88	11.02	3.31	8.64	9.17	
Tons of Constituents 1971									209,000	75,900	410,000	184,000	762,000	444,000	
Avg. Tons Period 1962-1971									251,000	95,100	513,000	198,000	831,000	565,000	

## Intake Canal at Morelos Diversion Structure

Jan.	31	1.70	119,200	1,868	1,251	7.9	49		5.48	3.81	9.00	3.57	7.60	7.12	
Feb.	28	1.71	152,800	1,938	1,263	7.8	50		5.68	3.96	9.52	3.61	7.78	7.74	
Mar.	31	1.66	316,700	1,897	1,225	7.8	49		5.57	3.94	9.32	3.45	7.82	7.56	
Apr.	30	1.69	294,100	1,936	1,238	8.0	50		5.53	3.99	9.60	3.51	7.79	7.81	
May	31	1.70	122,000	1,944	1,248	8.0	50		5.57	4.10	9.48	3.67	7.87	7.59	
June	30	1.77	215,100	2,017	1,296	8.0	51		5.57	4.10	10.24	3.65	7.98	8.27	
July	31	1.79	316,400	2,065	1,324	8.0	52		5.54	4.26	10.69	3.59	8.08	8.82	
Aug.	31	1.79	286,200	2,036	1,324	8.0	52		5.54	4.11	10.50	3.55	8.01	8.59	
Sept.	30	1.77	106,800	1,958	1,295	7.9	51		5.51	3.97	9.96	3.71	8.17	7.69	
Oct.	20	1.62	67,000	1,819	1,187	8.0	49		5.36	3.86	8.74	3.63	7.82	6.64	
Nov.	5	1.67	68,800	2,338	1,227	8.0	49		5.64	3.80	9.15	3.76	8.06	6.80	
Dec.	4	1.94	206,100	2,231	1,427	8.0	54		6.00	4.05	11.90	3.80	8.68	9.48	
Mean	30.2	1.74	2,271,100	2,004	1,275	7.9	50		5.58	4.00	9.84	3.62	7.97	7.84	
Period Avg.	1.79		2,530,900	2,093	1,319	8.0	50		5.82	4.41	10.44	3.39	8.08	8.20	
Tons of Constituents 1971									198,000	50,000	407,000	383,000	678,000	506,000	
Avg. Tons Period 1962-1971									217,000	119,000	417,000	376,000	726,000	514,000	

\*\* Percent of total cations

\*\*\* Percent of total anions

\* Weighted mean

Ø Total

## ELECTRICAL CONDUCTIVITY OF WATER SAMPLES

1971

The following tables show electrical conductivity, expressed in mhos per centimeter  $\times 10^6$  at  $25^\circ\text{C}$ , of individual water samples taken at Colorado River stations and in Mexican canals. Samples were taken at the Northerly and Southerly International Boundary stations by the United States Section of the Commission and conductivity determinations were made by the United States Geological Survey. Samples for the Intake Canal at Morelos Dam, Sanchez Majorada Canal, and Miguel C. Rodriguez Gaging Station were taken by the Mexican Section of the Commission and determinations were made by the Ministry of Hydraulic Resources.

Date EC $\times 10^6$ @ $25^\circ\text{C}$	Date EC $\times 10^6$ @ $25^\circ\text{C}$	Date EC $\times 10^6$ @ $25^\circ\text{C}$	Date EC $\times 10^6$ @ $25^\circ\text{C}$	Date EC $\times 10^6$ @ $25^\circ\text{C}$	Date EC $\times 10^6$ @ $25^\circ\text{C}$	Date EC $\times 10^6$ @ $25^\circ\text{C}$	Date EC $\times 10^6$ @ $25^\circ\text{C}$
--------------------------------------------------	--------------------------------------------------	--------------------------------------------------	--------------------------------------------------	--------------------------------------------------	--------------------------------------------------	--------------------------------------------------	--------------------------------------------------

## Colorado River at Northerly International Boundary

January	February	April	May	July	August	October	November
1 1950	15 1980	1 1810	16 1930	1 1900	16 2020	1 1310	16 1910
2 1950	16 1940	2 1870	17 1980	2 1910	17 2030	2 1490	17 1860
3 1980	17 1930	3 1860	18 1970	3 1830	18 1960	3 1670	18 1840
4 2150	18 1890	4 1770	19 1960	4 1900	19 1790	4 1750	19 1870
5 2070	19 2020	5 1810	20 2010	5 1900	20 1790	5 1830	20 1890
6 2090	20 1810	6 1850	21 2010	6 1900	21 1660	6 1860	21 1840
7 1970	21 1760	7 1810	22 1930	7 1930	22 1650	7 1870	22 1840
8 1990	22 1960	8 1830	23 1950	8 1910	23 1620	8 1870	23 1850
9 1770	23 1950	9 1810	24 2010	9 1900	24 1620	9 1870	24 1850
10 1900	24 2050	10 1820	25 1950	10 1910	25 1560	10 1890	25 1860
11 1970	25 2070	11 1860	26 1940	11 1840	26 1580	11 1880	26 1840
12 1760	26 2100	12 1820	27 1920	12 1960	27 1590	12 1900	27 1850
13 1720	27 1830	13 1800	28 1940	13 1710	28 1550	13 1860	28 1860
14 1700	28 1870	14 1780	29 1940	14 1740	29 1490	14 1850	29 1850
15 1730	March	15 1830	30 1900	15 1750	30 1910	15 1850	30 1870
16 1760	1 2050	16 1840	31 1910	16 1740	31 1920	16 1820	December
17 1750	2 2030	17 1890	June	17 1740	September	17 1860	1 1890
18 1780	3 1980	18 1900	1 1960	18 1730	1 1980	18 1840	2 1890
19 1780	4 1970	19 1880	2 1950	19 1790	2 1980	19 1840	3 1870
20 1790	5 2000	20 1860	3 1970	20 1920	3 1990	20 1840	4 1880
21 1770	6 1980	21 1920	4 1890	21 1950	4 1900	21 1790	5 1890
22 1780	7 1940	22 1920	5 1860	22 2000	5 1900	22 1800	6 1940
23 1780	8 1960	23 1930	6 1960	23 2000	6 1930	23 1850	7 1930
24 1740	9 1990	24 1950	7 1970	24 1930	7 2050	24 1860	8 1930
25 1750	10 1980	25 2010	8 1940	25 1940	8 1980	25 1870	9 1980
26 1780	11 1930	26 2020	9 1960	26 1970	9 1940	26 1910	10 1960
27 1770	12 1970	27 1920	10 1930	27 2000	10 1950	27 1890	11 1870
28 1720	13 1920	28 1820	11 1940	28 2000	11 1820	28 1850	12 1800
29 1740	14 1950	29 1820	12 1880	29 2040	12 1840	29 1840	13 2020
30 1740	15 1900	30 1860	13 1930	30 2010	13 1900	30 1820	14 1920
31 1740	16 1880	May	14 1970	31 1990	14 1880	31 1800	15 1950
February	17 1960	1 1940	15 1970	August	15 1910	November	16 1960
1 1750	18 1910	2 1880	16 2020	1 1960	16 1780	1 1830	17 2010
2 1770	19 1860	3 1950	17 1990	2 1990	17 1820	2 1880	18 2090
3 1750	20 1860	4 1950	18 1970	3 1990	18 1920	3 1910	19 2070
4 2040	21 1900	5 2000	19 2000	4 1980	19 1910	4 1890	20 2100
5 2020	22 1920	6 1970	20 1940	5 1990	20 1940	5 1860	21 2000
6 1890	23 1870	7 2000	21 1740	6 1990	21 1920	6 1860	22 2080
7 1830	24 1840	8 1950	22 2030	7 1910	22 1930	7 1830	23 1980
8 2000	25 1840	9 1930	23 1950	8 1810	23 1940	8 1860	24 2000
9 1960	26 1870	10 1930	24 1930	9 1980	24 1900	9 1880	25 2000
10 1820	27 1930	11 1910	25 1900	10 1990	25 1950	10 1870	26 2070
11 1760	28 1860	12 1930	26 1840	11 1970	26 1940	11 1860	27 2060
12 1770	29 1960	13 1920	27 1940	12 1960	27 1930	12 1870	28 2020
13 1680	30 1930	14 1950	28 1960	13 1930	28 1860	13 1870	29 1930
14 1900	31 1840	15 1830	29 1910	14 1780	29 1880	14 1880	30 1930
			30 1920	15 1940	30 1390	15 1880	31 1970

## ELECTRICAL CONDUCTIVITY OF WATER SAMPLES

1971

Date	ECx10 <sup>6</sup> @25°C	Date	ECx10 <sup>6</sup> @25°C	Date	ECx10 <sup>6</sup> @25°C	Date	ECx10 <sup>6</sup> @25°C	Date	ECx10 <sup>6</sup> @25°C	Date	ECx10 <sup>6</sup> @25°C	Date	ECx10 <sup>6</sup> @25°C	Date	ECx10 <sup>6</sup> @25°C	Date	ECx10 <sup>6</sup> @25°C
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## Intake Canal at Morelos Diversion Structure

January	February	March	April	June	July	August	September
1 2,150	8 2,000	18 1,800	25 2,300	1 1,875	9 2,300	17 2,350	24 1,950
2 2,200	9 1,900	19 1,800	26 2,100	2 2,075	10 2,300	18 2,250	25 1,950
3 2,100	10 1,825	20 1,875	27 2,025	3 1,850	11 1,850	19 1,950	26 1,950
4 2,100	11 1,750	21 1,750	28 1,975	4 2,000	12 1,850	20 1,850	27 2,000
5 2,200	12 1,800	22 1,750	29 1,825	5 2,100	13 1,950	21 2,000	28 1,900
6 1,975	13 1,875	23 2,250	30 2,050	6 2,100	14 2,000	22 1,950	29 1,950
7 2,100	14 1,900	24 1,750	May	7 1,800	15 2,000	23 1,800	30 1,300
8 2,000	15 2,000	25 2,200	1 2,050	8 1,800	16 2,000	24 1,750	October
9 2,200	16 1,850	26 1,700	2 1,900	9 2,100	17 1,950	25 1,650	1 1,325
10 1,950	17 2,000	27 2,000	3 1,875	10 1,800	18 2,050	26 1,625	2 1,500
11 2,050	18 1,900	28 1,850	4 1,925	11 2,100	19 1,650	27 1,700	3 1,675
12 1,800	19 1,975	29 1,900	5 1,900	12 2,100	20 2,250	28 1,650	4 1,800
13 1,700	20 1,975	30 1,750	6 2,050	13 2,100	21 2,300	29 1,500	5 1,850
14 1,700	21 1,975	31 2,200	7 1,900	14 1,800	22 1,800	30 2,075	6 1,900
15 1,700	22 2,000	April	8 1,875	15 2,100	23 2,300	31 1,975	7 1,900
16 1,700	23 2,050	1 1,700	9 1,900	16 1,850	24 1,950	September	8 1,900
17 1,750	24 1,950	2 1,700	10 1,900	17 2,150	25 2,300	1 2,100	9 1,875
18 1,750	25 2,100	3 2,200	11 2,050	18 2,150	26 2,050	2 2,000	10 1,900
19 1,750	26 2,150	4 1,750	12 1,850	19 1,875	27 2,300	3 2,150	11 1,900
20 1,775	27 2,200	5 1,900	13 1,850	20 2,275	28 1,800	4 2,150	12 1,875
21 1,775	28 2,100	6 1,700	14 2,000	21 1,925	29 2,025	5 2,100	13 1,875
22 1,775	March	7 1,775	15 2,000	22 1,850	30 2,300	6 2,000	14 1,900
23 1,775	1 2,100	8 1,850	16 1,850	23 2,200	August	7 2,000	15 1,850
24 1,725	2 1,950	9 1,700	17 2,050	24 1,875	1 2,300	8 2,100	16 1,850
25 1,725	3 1,950	10 1,850	18 1,850	25 1,850	2 2,100	9 2,050	17 1,900
26 1,775	4 1,900	11 1,825	19 1,875	26 2,200	3 2,300	10 2,000	18 1,850
27 1,750	5 1,900	12 1,700	20 1,875	27 2,300	4 2,000	11 2,000	*19 1,850
28 1,700	6 1,900	13 2,200	21 2,100	28 1,850	5 2,300	12 1,900	25 1,900
29 1,750	7 1,900	14 1,800	22 1,850	29 2,200	6 2,000	13 1,975	November
30 1,750	8 1,900	15 2,150	23 2,000	30 2,250	7 2,025	14 1,950	1 1,850
31 1,750	9 1,900	16 1,900	24 2,100	July	8 2,250	15 1,900	8 1,875
February	10 2,050	17 1,975	25 2,050	1 1,800	9 2,300	16 1,750	15 1,900
1 1,750	11 1,875	18 2,000	26 1,850	2 2,250	10 1,950	17 1,900	22 1,850
2 1,700	12 1,750	19 2,000	27 2,025	3 2,250	11 2,275	18 2,000	29 1,875
3 1,725	13 1,800	20 1,975	28 1,900	4 2,000	12 2,100	19 1,950	December
4 1,850	14 1,950	21 1,950	29 1,875	5 2,250	13 2,250	20 1,950	6 1,950
5 1,900	15 1,750	22 2,000	30 1,875	6 1,825	14 2,300	21 1,900	13 2,000
6 2,000	16 1,900	23 2,100	31 2,100	7 2,250	15 2,300	22 1,950	20 2,500
7 2,050	17 1,750	24 2,100		8 1,800	16 2,300	23 1,950	27 2,475

\* Sample collection changed from daily to weekly

## Colorado River at Southerly International Boundary

January	March	April	May	July	September	October	November
8 5500	2 2790	30 2350	18 4500	20 5460	7 4220	5 6160	2 6650
February	April	May	June	August	21 5260	26 6540	December
2 6830	7 1850	4 4560	1 4670	24 4470			7 6340
	20 2130	11 4620	22 5060				28 6000

**ELECTRICAL CONDUCTIVITY OF WATER SAMPLES****1971**

Date ECx10 <sup>6</sup> @25°C	Date ECx10 <sup>6</sup> @25°C	Date ECx10 <sup>6</sup> @25°C	Date ECx10 <sup>6</sup> @25°C	Date ECx10 <sup>6</sup> @25°C	Date ECx10 <sup>6</sup> @25°C	Date ECx10 <sup>6</sup> @25°C	Date ECx10 <sup>6</sup> @25°C
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**Sánchez Mejorada Canal**

January	February	April	May	July	August	October	November
8 2400	19 2400	2 2500	21 2400	2 2600	27 2500	9 2500	26 2500
15 2400	26 2500	12 2400	28 2500	9 2350	September	16 2300	December
22 2400	March	23 2600	June	16 2400	3 2400	22 2600	3 2500
29 2550	5 2500	30 2400	4 2500	August	10 2450	29 2500	10 2550
February	12 2400	May	11 2400	6 2500	17 2950	November	17 2400
4 2500	19 2500	7 2400	18 2600	13 2700	24 2500	8 2400	24 2400
12 2400	26 2500	14 2400	25 2600	20 2400	October	12 2400	31 2550
					1 2500		

**Colorado River at Miguel C. Rodriguez Gaging Station**

January	February	April	May	July	September	October	November
4 5600	22 4000	12 3200	31 3100	19 3100	6 3200	11 5600	8 6500
11 5000	March	19 3200	June	26 3200	20 3300	13 6500	15 6250
18 6000	1 3500	26 3200	7 3300	August	27 3100	20 5750	29 6100
25 2900	8 3600	May	14 3200	2 3300	30 3200	21 5750	December
February	15 3500	3 3200	21 3400	9 3200	October	22 6000	6 6200
1 6000	22 3300	10 3200	28 3200	16 3200	4 2500	23 5600	13 6000
8 6000	29 3400	17 3200	July	23 3100	7 5500	November	20 4100
15 4000	31 3400	24 3200	5 3200	30 3200	9 5700	6 6000	27 4900



## RAINFALL ON THE COLORADO RIVER WATERSHED IN INCHES

Tabulated below are monthly records of rainfall at stations located in California and Arizona in the United States and in Baja California and Sonora in Mexico, with averages for their periods of record. Records of daily rainfall amounts, where available, are on file in the offices of the United States or Mexican Sections of the Commission. For location, elevation, period of record, and the observer, see alphabetical listings of these stations on page 52 in this bulletin.

### In United States

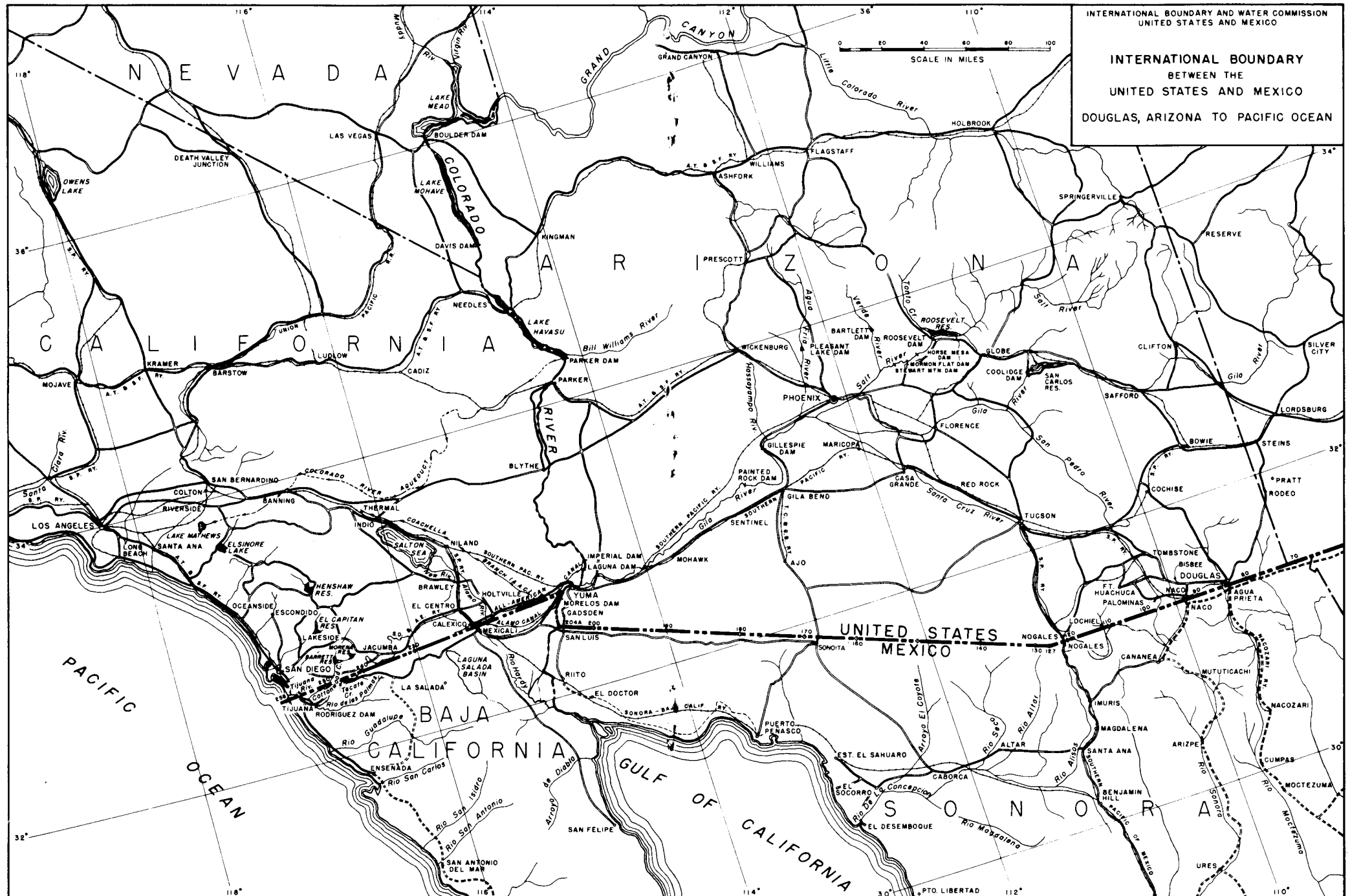
Month	Brawley, California		El Centro, California		Blythe, California		Davis Dam No. 2, Arizona		Yuma Citrus Station, Arizona	
	1971	Average 1931-1971	1971	Average 1931-1971	1971	Average 1931-1971	1971	Average 1955-1971	1971	Average 1931-1971
Jan.	0.03	0.31	0.03	0.34	0.08	0.45	0	0.38	0	0.37
Feb.	.03	.30	.03	.34	T	.38	.60	.43	.03	.34
Mar.	0	.16	0	.18	.03	.40	0	.35	0	.21
Apr.	.07	.08	.08	.10	.05	.15	0	.31	.30	.12
May	T	.01	0	0	T	.02	.46	.14	.11	.01
June	0	.01	0	.01	0	.02	0	.03	0	.02
July	T	.04	0	.10	0	.18	.02	.21	.02	.17
Aug.	.85	.30	.04	.32	1.35	.80	.61	.53	.23	.41
Sept.	.22	.33	.24	.26	.72	.33	.09	.29	1.35	.39
Oct.	.23	.21	.02	.22	.05	.27	.14	.29	.04	.37
Nov.	0	.15	0	.17	0	.25	.04	.44	0	.19
Dec.	.19	.43	0	.44	.01	.54	.76	.54	.10	.40
Yearly	1.62	2.33	0.44	2.48	2.29	3.79	2.72	3.94	2.18	3.00

### In Mexico

Month	Los Algodones, Baja California		Mexicali, Baja California		Bataques, Baja California		San Luis, R. C. Sonora		Delta, Baja California	
	1971	Average 1948-1971	1971	Average 1926-1971	1971	Average 1948-1971	1971	Average 1949-1971	1971	Average 1948-1971
Jan.	T	0.39	0.04	0.35	0	0.35	0	0.28	0	0.35
Feb.	0	.20	T	.31	0	.08	.04	.20	0	.08
Mar.	0	.12	0	.20	0	.04	T	.16	0	.12
Apr.	.31	.08	.08	.08	.28	.08	.98	.08	.39	.04
May	0	0	T	T	0	0	0	T	0	0
June	0	0	0	0	0	.04	0	0	0	0
July	0	.08	T	.12	.08	.04	.04	.20	T	.04
Aug.	.39	.20	.16	.31	.08	.12	.57	.39	.63	.16
Sept.	.94	.24	.59	.39	0	.04	1.26	.24	.79	.16
Oct.	.08	.28	.16	.24	0	.20	.47	.20	.08	.12
Nov.	0	.16	0	.16	0	.16	0	.63	0	.16
Dec.	.08	.31	.08	.79	.08	.20	.16	.55	.16	.28
Yearly	1.81	2.06	1.10	2.95	0.51	1.34	3.62	2.05	2.05	1.46

Month	Kilometer 50, Baja California		Riito, Sonora		El Mayor, Baja California		San Felipe, Baja California			
	1971	Average 1952-1971	1971	Average 1959-1971	1971	Average 1949-1971	1971	Average 1948-1971		
Jan.	0	0.55	0	0.24	0	0.20	0	0.28		
Feb.	0	.24	.04	.08	0	.12	0	.12		
Mar.	0	.28	0	.08	0	.12	# 0	.16		
Apr.	.35	.16	.31	.04	.16	.04	*	.08		
May	0	.04	0	0	0	0	*	T		
June	0	0	0	0	0	0	*	.08		
July	.08	.16	.12	.08	T	.08	# 0	.12		
Aug.	.63	.35	1.30	.16	1.14	.35	1.61	.35		
Sept.	1.06	.28	1.14	.67	.79	.55	.31	.43		
Oct.	0	.35	.08	.04	T	.20	.12	.28		
Nov.	0	.28	0	.31	0	.16	# .24	.16		
Dec.	.08	.35	.04	.39	0	.31	# .08	.35		
Yearly	2.20	2.01	3.03	2.20	2.09	2.17	*	2.43		

T Trace      \* Registered incomplete      # Some days missing





# LOCATION OF RAINFALL STATIONS ON THE COLORADO RIVER WATERSHED

The precipitation records of the stations listed alphabetically below began on the date shown and extend through 1971.

## In United States

NAME OF STATION	LATI- TUDE	LONGI- TUDE	ELEV. ( FT.)	RECORD BEGAN	OBSERVER
* Blythe, California	33° 37'	114° 36'	268	1909	State Division of Forestry
Brawley, California	32° 57'	115° 33'	100	1908	Agricultural Research Service
* Davis Dam No. 2, Arizona	35° 12'	114° 34'	657	1954	U. S. Bureau of Reclamation
El Centro, California	32° 46'	115° 34'	30	1930	El Centro Water Department
Yuma Citrus Station, Arizona	32° 37'	114° 39'	191	1923	University of Arizona Experimental Farm

## In Mexico

NAME OF STATION	LATI- TUDE	LONGI- TUDE	ELEV. ( FT.)	RECORD BEGAN	OBSERVER
Bataques, Baja California	32° 33'	115° 04'	** 66	1948	Hydraulic Resources
Delta, Baja California	32° 21'	115° 11'	** 39	1948	Hydraulic Resources
El Mayor, Baja California	32° 03'	115° 15'	** 33	1949	Hydraulic Resources
Kilometer 50, Baja California	32° 15'	115° 03'	49	1952	Hydraulic Resources
Los Algodones, Baja California	32° 42'	114° 44'	115	1948	Hydraulic Resources
Mexicali, Baja California	32° 40'	115° 28'	13	1926	Hydraulic Resources
Riito, Sonora	32° 10'	114° 57'	** 39	1959	Hydraulic Resources
* San Felipe, Baja California	31° 02'	114° 53'	33	1948	Hydraulic Resources
San Luis, R.C., Sonora	32° 28'	114° 47'	131	1949	Hydraulic Resources

\* Not shown on map      † Elevation above mean sea level except Brawley and El Centro which are elevations below mean level

\*\* Elevations obtained from International Boundary and Water Commission topographic maps

## EVAPORATION IN THE COLORADO RIVER BASIN IN INCHES

Tabulated below are records of evaporation observed at two stations in Arizona and at nine stations in Baja California and Sonora, Mexico. The stations in the United States are operated by the U. S. Bureau of Reclamation and by the University of Arizona Experimental Farm. The stations in Mexico are operated by the Ministry of Hydraulic Resources. The type of pan used at all these stations was the National Weather Service standard pan, four feet in diameter. For specific location of these stations, refer to data opposite the same station name shown in "Location of Rainfall Stations", page 52 in this bulletin.

### In United States

Month	Davis Dam No. 2, Arizona		Yuma Citrus Station, Arizona	
	1971	Average 1955-1971	1971	Average 1931-1971
Jan.	8.27	7.41	4.46	3.92
Feb.	7.81	7.63	5.41	4.92
Mar.	13.00	10.35	8.09	7.87
Apr.	13.19	13.42	9.88	10.28
May	15.73	17.12	11.33	13.31
June	18.38	19.64	12.91	14.54
July	21.42	20.23	15.02	15.73
Aug.	15.99	18.17	11.73	13.89
Sept.	17.60	15.17	10.34	11.04
Oct.	11.30	12.31	6.61	7.79
Nov.	8.46	8.89	4.18	5.07
Dec.	5.78	7.81	2.95	3.66
Yearly	156.93	158.15	102.91	112.02

### In Mexico

Month	Los Algodones, Baja California		Mexicali, Baja California		Bataques, Baja California		San Luis, R. C., Sonora	
	1971	Av. 1949-55 1961-1971	1971	Average 1926-1971	1971	Average 1963-1971	1971	Average 1953-1971
Jan.	4.72	4.21	2.80	2.60	3.78	3.86	3.86	3.31
Feb.	5.63	5.16	3.82	3.50	4.53	5.08	4.33	4.02
Mar.	9.72	7.36	6.38	5.83	7.68	7.44	7.56	6.30
Apr.	10.00	9.76	7.72	7.91	8.23	9.21	8.27	8.39
May	12.52	12.44	10.16	10.51	11.22	12.05	10.39	10.98
June	15.20	13.03	11.81	11.54	12.56	12.32	12.68	12.56
July	14.61	13.07	12.64	11.73	13.15	12.72	14.84	14.17
Aug.	12.05	11.81	10.00	10.08	10.35	10.51	11.65	12.83
Sept.	11.34	9.84	8.50	8.15	9.45	9.13	9.96	10.04
Oct.	7.72	7.80	4.49	5.59	5.67	6.22	5.94	6.65
Nov.	4.88	4.88	3.70	3.39	4.21	4.80	3.98	4.41
Dec.	3.86	3.94	2.56	2.44	3.11	3.39	2.95	3.23
Yearly	112.24	104.80	84.57	83.31	93.94	96.77	95.24	98.31

Month	Delta, Baja California		Kilometer 50, Baja California		Riito, Sonora		El Mayor, Baja California		San Felipe, Baja California	
	1971	Average 1959-1971	1971	† Average 1950-1959 1961-1971	1971	Average 1963-1971	1971	Average 1953-1971	1971	Average 1952-1971
Jan.	3.66	3.23	3.31	3.23	3.03	3.15	3.03	3.50	5.00	5.20
Feb.	3.78	4.21	4.09	4.02	3.90	4.13	3.62	4.21	* 5.24	5.91
Mar.	6.26	6.38	7.28	6.38	6.73	6.02	5.39	5.10	* 7.09	7.09
Apr.	7.83	8.15	6.97	6.85	7.44	7.24	5.63	7.91	† 8.54	8.54
May	8.98	10.28	9.02	9.65	9.84	9.51	7.99	9.92	† 10.59	10.59
June	11.73	11.18	10.43	10.71	11.46	10.91	6.50	10.79	† 10.94	10.94
July	13.58	11.42	11.42	11.61	13.58	12.01	5.71	12.01	10.83	11.81
Aug.	12.48	10.16	8.90	9.13	9.80	9.53	† 11.73	9.76	8.82	10.94
Sept.	10.39	8.19	8.23	8.19	8.43	7.50	† 10.04	7.50	5.91	8.50
Oct.	6.10	5.83	6.02	5.75	5.20	5.16	6.26	4.53	4.13	6.26
Nov.	4.53	3.74	4.61	4.29	3.31	3.35	4.06	4.53	3.07	5.16
Dec.	2.20	2.68	2.80	2.76	2.50	2.68	3.46	3.78		
Yearly	91.54	86.26	83.07	82.72	85.31	84.57	*	92.17	*	101.81

0 One year missing

\* Record incomplete

† Did not register

‡ 1969 missing

## TEMPERATURE IN THE COLORADO RIVER BASIN IN DEGREES FAHRENHEIT

The maximum, minimum, and monthly mean temperature observations for United States stations are from daily readings of thermometers generally exposed in a shelter located a few feet above sod-covered ground. The maximum and minimum temperatures shown for the stations in Mexico are from daily maximum and minimum thermometer observations, with maximum and minimum for their periods of record. For specific location, elevation, period of record, and the observer, refer to data opposite same station name as shown in "Location of Rainfall Stations", page 52 in this bulletin.

### In United States

Month	Blythe, California				Davis Dam No. 2, Arizona				Yuma Citrus Station, Arizona			
	1971			Average 1931-71	1971			Average 1955-71	1971			Average 1931-71
	Mean	Max.	Min.		Mean	Max.	Min.		Mean	Max.	Min.	
Jan.	51.9	87	22	52.6	53.0	83	28	52.9	53.5	88	26	53.1
Feb.	57.8	87	33	57.3	57.0	79	38	56.7	56.8	88	35	57.0
Mar.	63.5	99	28	63.0	62.0	95	38	62.1	62.0	97	30	
Apr.	67.5	97	42	70.2	68.1	95	38	69.5	66.2	96	41	68.8
May	74.0	101	48	77.4	72.6	102	34	78.3	70.4	101	45	75.9
June	85.1	114	50	84.9	87.2	114	58	88.2	81.4	112	50	83.3
July	94.0	120	66	92.1	96.1	118	72	94.9	91.1	114	63	91.2
Aug.	92.1	111	71	91.2	93.1	112	73	93.6	90.0	112	71	90.6
Sept.	84.7	116	50	85.1	83.8	114	50	85.9	84.7	115	51	85.2
Oct.	68.6	102	29	73.2	68.9	100	33		68.0	99	33	73.6
Nov.	58.7	85	37	60.3	58.6	80	38		58.6	86	34	61.6
Dec.	50.6	75	26	53.3	49.3	70	29	54.0	50.9	75	29	54.6
Yearly	70.7	120	22	71.7	70.8	113	28		69.5	115	26	

Month	Brawley, California				El Centro, California			
	1971			Average 1931-71	1971			Average 1931-71
	Mean	Max.	Min.		Mean	Max.	Min.	
Jan.	53.0	89	20	53.7	54.7	90	20	53.7
Feb.	57.4	89	34	58.0	58.3	90	35	57.8
Mar.	62.4	96	28	63.4	62.9	95	29	63.1
Apr.	65.4	92	40	70.4	66.8	94	39	69.9
May	72.4	99	50	77.7	73.3	100	46	77.3
June	81.9	112	52	85.0	83.8	114	50	84.7
July	90.8	113	63	92.2	92.6	115	64	91.9
Aug.	90.9	110	67	91.9	92.4	115		91.3
Sept.	84.9	115	52	86.6	86.0	119	51	85.8
Oct.	68.6	101	30	75.2	69.2	104	35	74.6
Nov.	59.8	87	36	62.6	60.5	88	34	62.2
Dec.	50.8	70	27	55.1	51.5	74	27	54.8
Yearly	69.9	115	20	72.6	71.0	119	20	72.3

### In Mexico

Month	Los Algodones, Baja California				Mexicali, Baja California				Bataques, Baja California			
	1971		1948-1971		1971		1926-1971		1971		1948-1971	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Jan.	88	27	88	23	90	21	93	19	88	16	113	16
Feb.	88	37	95	28	86	34	93	23	90	28	99	21
Mar.	99	34	100	32	97	30	100	30	95	32	113	25
Apr.	95	43	109	37	99	39	106	34	97	39	118	16
May	99	50	117	43	100	48	117	43	102	50	124	34
June	111	52	126	52	111	48	120	48	113	52	135	43
July	113	68	118	61	113	66	118	55	115	66	133	45
Aug.	109	75	120	61	115	68	118	54	111	70	129	46
Sept.	115	55	122	54	115	54	122	48	113	52	135	39
Oct.	99	34	111	32	100	32	109	32	104	32	118	32
Nov.	88	39	100	27	84	37	99	28	88	36	115	32
Dec.	75	34	88	28	75	28	90	23	77	25	97	25
Yearly	115	27	126	23	115	21	122	19	115	16	135	16

# TEMPERATURE IN THE COLORADO RIVER BASIN IN DEGREES FAHRENHEIT

## In Mexico

Month	San Luis, R. C., Sonora				Delta, Baja California				Kilometer 50, Baja California			
	1971		1949-1971		1971		1948-1971		1971		1950-59 & 61-71	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Jan.	86	23	100	19	91	27	104	27	81	19	91	19
Feb.	88	28	109	27	91	36	104	28	88	32	97	21
Mar.	95	28	108	28	102	32	113	28	97	25	99	25
Apr.	95	41	115	37	97	45	118	32	99	37	106	30
May	99	50	115	41	102	52	129	32	100	43	117	36
June	111	52	126	45	115	54	133	36	117	46	118	39
July	113	68	126	59	115	64	135	45	117	64	120	45
Aug.	109	64	122	55	111	72	140	52	117	64	118	50
Sept.	115	50	118	50	115	54	135	39	122	50	122	39
Oct.	97	32	118	32	102	34	117	34	118	39	118	36
Nov.	86	36	113	30	97	39	120	32	99	37	104	25
Dec.	75	28	102	23	82	28	104	27	73	32	97	19
Yearly	115	23	126	19	115	27	140	27	122	19	122	19

Month	Riito, Sonora				El Mayor, Baja California				San Felipe, Baja California			
	1971		1949-1971		1971		1949-1971		1971		1948-1971	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Jan.	88	21	91	19	91	34	108	23	75	32	99	30
Feb.	88	32	95	21	88	34	93	27	82	32	102	32
Mar.	100	28	100	25	99	37	100	32	*	*	104	32
Apr.	95	39	109	37	104	41	108	36	*	*	113	37
May	100	45	115	43	108	43	113	37	*	*	120	41
June	113	46	124	45	106	48	122	37	*	*	124	50
July	117	64	140	52	120	43	122	39	100	66	124	50
Aug.	109	64	122	46	122	54	122	41	113	63	135	41
Sept.	115	50	118	39	117	52	120	34	95	63	126	37
Oct.	102	30	115	30	99	45	120	37	93	54	117	41
Nov.	88	32	118	27	88	32	120	32	186	43	118	21
Dec.	75	27	86	21	86	23	106	19	182	39	97	28
Yearly	117	21	140	19	122	23	122	19	*	*	135	21

\* Record incomplete

† Some days missing

**IRRIGATED AREAS ALONG COLORADO RIVER BELOW IMPERIAL DAM**  
**1971**

The total drainage area within the Colorado River basin is about 246,000 square miles, of which 184,600 square miles lie above Imperial Dam and about 61,400 square miles are below the dam. Of the area below Imperial Dam, 59,000 square miles are in the United States and about 2,000 square miles are in Mexico. The area below Imperial Dam includes the Gila River watershed with a total area of about 58,200 square miles, of which about 1,100 square miles are in Mexico.

The irrigated areas tabulated below comprise the areas in the United States and Mexico which are served by diversions from the Colorado River at or below Imperial Dam. The diversions are supplemented by some pumping from wells in both countries. The areas in the United States include: 1) those within the U. S. Bureau of Reclamation Projects and in the North and South Gila Valleys located near Yuma, Arizona, the data for which are furnished by the U. S. Bureau of Reclamation; 2) those within the Coachella Valley, California, the data for which are furnished by the Coachella Valley County Water District and State of California Department of Water Resources; and 3) those within the Imperial Valley, California, the data for which are furnished by the Imperial Irrigation District. The areas in Mexico include those in the Mexicali Valley located in the states of Baja California and Sonora, the data for which are furnished by the Ministry of Hydraulic Resources of Mexico. The areas tabulated below refer to the total areas farmed, and insofar as possible, duplication of irrigated areas because of double cropping has been eliminated.

Point of Diversion from Colorado River and Designation of Areas	Total Irrigated Areas Acres
IN UNITED STATES:	
Imperial Dam	
Yuma Valley Division	45,312
Reservation Division	11,368
Yuma Mesa	17,189
Yuma Aux. Project Unit "B" (Yuma Mesa)	3,116
South Gila Valley	10,223
North Gila Valley	5,904
Weilton-Mohawk	61,152
Coachella Valley	52,371
Imperial Valley	441,783
Warren Act	80
Non-Project lands adjacent to Colorado River	10,200
Total in United States	658,698
IN MEXICO:	
Morelos Dam	
Mexicali Valley	* 429,088
Total in United States and Mexico	1,087,786

\* An estimated one-third of total acreage is served by pumping from ground water in Mexicali Valley



## ALAMO RIVER AT INTERNATIONAL BOUNDARY

**DESCRIPTION:** Staff gage located on the right bank of the river, about 7 miles east of Calexico, California, immediately downstream from the international land boundary between the United States and Mexico and a few feet upstream from a 4-foot Cipolletti weir set in the throat of a twin-tube concrete culvert which carries the river flow under the All-American Canal.

**RECORDS:** Computed on the basis of head on the Cipolletti weir from daily staff gage readings, and weir ratings as determined by monthly current meter measurements. Records obtained and furnished by Imperial Irrigation District. Records available: June 1942 through 1971.

**REMARKS:** The flow at this station normally comprises seepage from the All-American Canal and drainage water from the Mexicali Valley which enters the United States.

**EXTREMES:** Maximum mean daily discharge, 258 second-feet (estimated), April 13, 1946; minimum discharge, no flow July 22-23, 29-30, 1949. Prior to the period of record, and since 1900, considerably higher flows occurred. During the years 1905 to 1907, when the Colorado River flowed into the Salton Sea, a part of its flow passed through the Alamo River channel.

## Mean Daily Discharge in Second Feet 1971 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.44	1.49	2.00	1.20	1.39	2.21	1.68	2.00	3.15	2.21	1.79	2.21
2	2.55	1.39	1.68	1.39	1.39	2.67	1.68	1.79	3.15	2.21	1.89	2.21
3	2.67	1.58	1.68	1.39	1.49	2.67	1.68	1.79	2.79	2.55	2.67	2.32
4	2.44	1.58	1.68	1.49	1.49	2.00	1.58	1.89	3.03	2.44	2.79	2.55
5	2.55	1.58	1.68	1.58	1.89	1.89	1.58	1.89	3.41	2.32	2.55	2.55
6	1.39	2.00	1.68	1.89	2.00	1.89	1.58	1.79	3.03	3.03	2.55	2.44
7	2.00	2.00	2.00	2.00	1.89	1.89	1.89	1.79	3.15	3.03	2.79	2.21
8	2.00	2.00	1.79	1.89	1.89	2.00	1.89	1.79	3.03	2.79	2.67	2.67
9	2.00	2.00	2.10	1.79	1.79	1.68	1.68	1.79	3.15	2.67	2.44	2.67
10	2.00	2.21	2.55	1.89	2.00	1.68	1.89	1.89	3.03	3.15	2.67	2.67
11	2.10	2.00	2.32	1.68	1.89	1.79	1.89	2.00	2.00	2.44	2.55	2.55
12	2.32	2.00	2.21	1.89	2.00	1.79	1.79	2.00	2.00	2.44	2.55	2.55
13	1.89	2.00	2.00	1.89	1.89	1.89	2.00	2.00	2.00	2.55	2.67	2.55
14	2.00	1.79	2.32	2.21	1.89	2.00	1.79	1.79	2.44	2.55	2.44	2.55
15	2.00	1.79	2.21	2.10	2.10	1.89	1.79	1.68	2.55	2.55	2.44	2.10
16	1.89	1.68	1.89	2.21	1.89	2.91	1.58	1.79	2.21	2.79	2.67	2.00
17	1.79	1.68	2.00	2.21	2.00	2.67	1.68	1.89	2.21	2.79	2.79	2.00
18	1.39	2.00	2.00	2.21	1.39	2.79	1.68	2.00	2.44	2.91	2.79	1.89
19	1.49	1.89	2.00	2.21	1.03	2.44	1.79	2.00	2.32	2.91	2.79	2.21
20	1.79	2.00	1.79	1.89	1.03	2.44	2.10	1.89	2.44	3.03	1.89	2.00
21	1.79	2.00	2.00	1.89	1.20	2.67	2.00	1.89	3.03	2.91	1.89	2.21
22	2.00	2.00	1.79	1.58	1.20	2.21	2.21	2.00	3.15	2.79	2.00	1.89
23	3.03	2.00	1.68	1.58	1.39	1.58	1.89	2.10	3.15	2.91	2.00	2.00
24	1.79	1.58	1.68	1.58	1.58	1.03	2.00	2.67	3.03	3.15	2.21	2.00
25	1.79	1.68	1.68	1.89	2.21	1.49	2.00	2.67	2.79	2.91	2.21	2.00
26	1.68	1.79	1.49	1.89	2.00	1.03	2.00	2.91	3.15	3.03	2.44	2.10
27	1.30	1.79	1.49	1.79	2.00	1.03	2.00	3.03	3.03	1.49	2.44	2.21
28	1.30	1.89	1.58	1.58	2.00	1.39	3.41	3.15	1.89	1.58	2.67	1.89
29	1.39	1.89	1.68	1.39	2.21	1.39	1.68	3.15	2.21	1.58	2.44	2.00
30	1.39	1.39	1.39	1.39	2.10	1.39	1.68	3.03	2.21	1.58	2.21	2.00
31	1.49		1.20		2.21		2.00	1.89		1.68		1.89
Sum	59.65	51.39	57.24	53.57	54.43	58.40	58.09	65.94	81.17	78.97	72.90	69.09

Current Year 1971								Period 1943-1971			
Month	Extreme Gage Feet		Extreme Second Feet			Average Second Feet	Total Acre Feet	Acre Feet			
	High	Low	Day	High	Low			Average	Maximum	Minimum	
Jan.	0.37	0.21	23	3.03	127	1.30	118	388	2,790	99	
Feb.	.30	.22	10	2.21	2	1.39	102	352	2,822	100	
Mar.	.33	.20	10	2.55	31	1.20	114	394	3,154	111	
Apr.	.30	.20	114	2.21	1	1.20	106	423	2,222	97	
May	.30	.18	125	2.21	119	1.03	108	326	1,799	73	
June	.36	.18	16	2.91	124	1.03	116	323	1,686	61	
July	.40	.24	28	3.41	14	1.58	115	297	1,712	59	
Aug.	.38	.25	28	3.15	15	1.68	131	356	1,672	83	
Sept.	.40	.27	5	3.41	28	1.89	161	337	1,406	91	
Oct.	.38	.23	110	3.15	27	1.49	157	364	1,845	102	
Nov.	.35	.26	14	2.79	1	1.79	145	371	2,080	86	
Dec.	.34	.27	18	2.67	118	1.89	137	342	1,686	80	
Yearly	0.40	0.18		3.41		1.03	2.09	1,510	4,273	22,146	1,251

φ Mean daily

† And other days

## NEW RIVER AT INTERNATIONAL BOUNDARY

**DESCRIPTION:** Water-stage recorder located on the left (west) bank of the river in the limits of the city of Calexico, California, 1,400 feet downstream (north) of the international land boundary between the United States and Mexico. Measurements are made from a foot bridge at the gage.

**RECORDS:** Based on a continuous record of gage heights and weekly current meter measurements, supplemented by additional measurements during periods of high flow by the Imperial Irrigation District. Measurements are also made generally once each month by the United States Section of the Commission. Records computed and furnished by the District. Records available: June 1942 through 1971.

**REMARKS:** The New River flows northward from Mexico into the United States and thence into the Salton Sea. The flow at this station normally comprises 1) a portion of the waste and drainage water from the irrigation system in the Mexicali Valley, and 2) sewage and other wastes from Mexicali, Baja California. Flood waters enter the river from local drainage in Mexico and such waters can reach damaging rates during violent desert storms. Waste flows from the Mexican system of canals are limited to an average annual quantity of 35,000 acre-feet during any successive five-year period under the provisions of Minute No. 197 of the Commission.

**EXTREMES:** Maximum mean daily discharge, 691 second-feet on December 3, 1962; minimum mean daily discharge, 2 second-feet on May 14, 1945. Prior to the period of record, and since 1900, much higher flows occurred. During the years 1905 to 1907, when Colorado River flowed into the Salton Sea, a considerable part of its flow passed through the New River channel.

## Mean Daily Discharge in Second Feet 1971 — Annual and Period Summary

Mean Daily Discharge in Second Feet 1971												
Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	135	124	145	168	177	137	146	158	186	143	109	130
2	142	123	145	167	176	133	151	169	205	145	117	131
3	139	125	145	166	172	135	152	158	184	145	126	128
4	146	125	145	162	165	135	155	154	179	148	128	129
5	136	122	149	167	169	136	160	152	177	161	130	129
6	128	120	151	167	172	137	151	149	173	151	134	132
7	131	118	151	168	161	135	147	156	168	151	140	128
8	135	118	150	169	160	133	149	164	158	156	131	127
9	137	119	154	160	158	128	149	174	157	169	127	126
10	135	120	158	162	158	126	150	176	157	215	130	120
11	139	124	160	164	155	128	151	177	155	192	130	120
12	137	124	161	167	151	126	155	175	155	160	128	118
13	140	128	160	170	149	127	154	177	158	163	129	120
14	140	127	162	174	144	137	154	179	156	169	129	122
15	138	130	160	177	141	141	156	178	151	182	130	122
16	140	132	159	179	134	143	158	184	148	158	127	123
17	141	136	163	187	132	141	153	171	146	133	123	124
18	143	136	163	185	132	138	151	162	138	139	125	125
19	144	134	179	188	130	131	148	162	133	131	124	127
20	147	133	179	193	134	135	148	163	129	129	126	132
21	140	127	175	200	135	140	145	169	136	134	131	137
22	137	131	179	207	138	139	145	178	145	131	136	139
23	134	119	182	209	145	151	149	185	142	133	135	135
24	123	105	175	200	154	148	153	192	141	132	141	133
25	118	111	170	187	147	148	158	195	138	135	135	137
26	125	117	168	182	138	143	163	215	138	133	134	131
27	133	128	168	177	134	139	162	254	139	131	130	130
28	133	136	165	177	135	137	156	259	135	125	129	124
29	129		168	184	137	139	152	260	145	120	130	116
30	127		169	182	137	144	155	195	136	112	130	120
31	123		168		140		158	179		109		123
Sum	4,195	3,492	5,026	5,345	4,610	4,110	4,734	5,619	4,609	4,535	3,874	3,936
Current Year 1971												
Month	Extreme Gage ** Feet		Extreme Second Feet				Average Second Feet	Total Acre Feet	Period 1943-1971 Acre Feet			
	High	Low	Day	High	Low	Day	Acre Feet	Average	Maximum	Minimum		
Jan.	41.83	42.04	20	147	25	118	135	8,321	7,080	20,160	1,751	
Feb.	41.85	42.09	17	136	24	105	125	6,926	5,845	17,845	1,258	
Mar.	41.52	41.95	23	182	1	145	162	9,969	6,524	12,960	1,008	
Apr.	41.12	41.69	23	209	9	160	178	10,602	6,704	14,489	1,390	
May	41.43	42.01	1	177	19	130	149	9,144	5,917	10,618	629	
June	41.33	42.10	23	151	110	126	137	8,152	5,112	9,689	1,087	
July	41.61	41.81	26	163	121	145	153	9,390	5,054	9,390	817	
Aug.	41.03	41.69	29	260	6	149	181	11,145	6,075	11,145	1,139	
Sept.	41.12	41.93	2	206	20	129	154	9,142	6,357	12,688	1,795	
Oct.	41.09	41.99	11	215	31	109	146	8,995	6,538	11,710	2,081	
Nov.	41.81	42.08	24	141	1	109	129	7,684	6,264	12,323	2,483	
Dec.	41.85	42.15	22	139	29	116	127	7,811	6,905	21,205	1,763	
Yearly	41.95	41.69		260		105	148	107,281	74,376	138,906	24,573	

† Mean daily

‡ And other days

\*\* Feet below mean sea level

## WASTES FROM MEXICALI POTABLE WATER PLANT TO NEW RIVER IN MEXICO

**DESCRIPTION:** The Potable Water Plant of Mexicali, Baja California, discharges waste water into a canal, approximately 2.5 miles long, that empties into the Rivera Drain and thence into New River, approximately 0.9 mile above the international boundary. The measurements are taken in the wasteway canal 0.4 mile above the confluence with Rivera Drain, 1.2 miles below the plant, and 1.2 miles south of the international boundary.

**RECORDS:** Based on 49 double current meter measurements made during the year by wading. Data obtained and furnished by the Mexican Section of the Commission. Data available: January 1968 through 1971.

**REMARKS:** The Potable Water Plant is operated by the State Commission of Public Services of Mexicali and water is obtained from the West Main Canal which is a part of Mexico's system of canals in the Colorado River Irrigation District. The plant was completed in 1963 and began operation on September 28, 1963. Prior to 1968, the volumes wasted were small and infrequent.

### Mean Daily Discharge in Second Feet 1971 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	4.9	3.5	4.6	3.5	3.5	9.9	6.4	9.9	7.8	30.4	8.1	4.6
2	5.7	3.5	4.2	3.9	3.5	8.1	6.4	9.9	8.1	9.9	7.1	6.0
3	6.0	3.2	3.5	4.6	3.5	9.2	6.4	6.7	8.1	9.9	8.1	3.5
4	6.4	3.2	3.2	4.6	3.5	9.9	6.7	7.4	7.8	6.0	6.4	4.6
5	6.7	3.2	2.8	4.6	3.9	6.7	5.7	11.7	9.2	4.2	6.0	4.9
6	6.4	3.2	2.5	4.6	3.9	6.4	5.7	8.1	7.8	4.9	6.4	5.7
7	6.4	3.2	3.2	4.2	3.9	5.7	5.7	9.9	6.0	6.0	7.1	4.9
8	6.0	3.2	3.5	4.2	3.9	6.7	5.7	11.7	6.0	4.9	4.9	4.6
9	5.7	3.2	4.2	4.2	4.6	6.7	5.7	10.6	5.7	5.7	6.4	4.6
10	5.3	2.8	4.6	4.2	6.7	6.7	5.7	8.1	6.4	7.8	7.1	4.2
11	5.3	2.8	5.3	4.2	5.3	7.1	6.7	13.8	5.7	4.2	5.7	4.2
12	4.9	2.8	5.7	4.2	5.3	5.3	5.7	12.4	6.4	4.2	5.7	4.2
13	4.6	2.8	6.4	4.2	6.0	6.7	6.4	10.6	6.4	4.9	4.9	4.2
14	4.2	4.2	6.0	3.9	5.7	4.9	6.4	10.6	5.7	21.2	6.0	3.2
15	4.2	5.3	6.0	3.9	5.7	5.3	6.4	12.4	5.7	6.4	6.0	3.5
16	3.9	6.7	5.7	3.9	6.4	5.3	8.8	12.4	6.4	6.4	7.8	4.9
17	4.2	7.8	5.3	3.9	5.3	6.4	5.7	5.3	6.4	9.9	7.1	5.7
18	4.6	9.2	4.9	3.9	7.1	6.4	7.1	6.7	7.8	8.8	7.1	4.6
19	4.9	10.2	4.9	3.5	7.1	6.4	5.3	7.4	9.9	6.0	7.1	5.7
20	4.9	11.7	4.6	3.5	4.9	6.7	4.9	8.1	12.0	6.0	6.4	4.2
21	5.3	10.6	4.2	3.5	5.3	6.7	6.7	10.6	8.1	5.7	7.1	4.2
22	5.7	9.9	4.2	3.5	4.6	6.4	6.4	13.8	7.1	6.4	4.2	4.2
23	6.0	8.8	3.9	3.2	6.4	6.4	7.1	13.4	10.6	7.8	4.6	4.2
24	5.7	8.1	3.5	3.2	6.0	6.7	6.7	8.8	9.2	8.8	4.6	4.2
25	5.3	7.1	3.2	3.2	5.7	6.7	8.1	8.1	8.8	8.1	4.9	4.9
26	4.9	6.4	3.2	3.2	6.4	6.7	6.7	6.7	17.0	9.2	4.2	5.7
27	4.6	5.3	2.8	3.2	9.5	7.1	6.4	8.8	14.8	8.8	4.2	4.6
28	4.2	4.9	2.8	3.5	10.2	6.4	6.4	8.1	9.9	7.8	4.9	3.5
29	3.9		2.8	3.5	10.2	7.1	7.1	9.9	19.8	8.8	4.6	4.2
30	3.5		2.8	3.5	9.5	6.7	7.8	8.8	25.8	7.8	4.2	4.2
31	3.5		2.8		8.8		6.4	9.9		6.4		3.5
Sum	157.9	156.8	127.5	115.5	182.2	203.1	198.5	300.5	276.5	253.2	178.2	139.8

Month	Current Year 1971						Period 1968-1971			
	Extreme Gage Feet		Extreme Second Feet			Average Second Feet	Total Acre Feet	Acre Feet		
	High	Low	Day	High	Low			Average	Maximum	Minimum
Jan.	1.44	0.20	† 1	22.6	† 12	1.4	4.9	313	215	313
Feb.	1.38	.23	28	21.2	26	1.4	5.7	311	203	311
Mar.	1.28	.20	6	19.1	12	1.4	4.2	253	366	871
Apr.	1.28	.23	8	19.1	3	1.4	3.9	229	208	233
May	1.38	.26	3	21.2	22	1.8	6.0	362	290	362
June	1.61	.20	1	26.8	15	1.4	6.7	403	230	403
July	1.12	.26	16	15.5	† 5	1.8	6.4	394	283	394
Aug.	1.38	.30	† 2	21.2	26	2.1	9.5	596	366	596
Sept.	2.59	.33	30	46.3	† 10	2.5	9.2	549	388	549
Oct.	2.99	.26	1	54.7	† 5	1.8	8.1	502	308	502
Nov.	1.90	.10	6	32.1	21	.4	6.0	354	236	354
Dec.	1.08	.23	1	14.8	22	1.4	4.6	277	215	277
Yearly	2.99	0.10		54.7		0.4	6.4	4,543	3,307	4,543
										2,745

† And other days

## WISTERIA WASTEWAY TO NEW RIVER IN MEXICO

**DESCRIPTION:** Staff gage located near operator's house upstream from wasteway gates, 1,000 feet downstream from the confluence of the Cerro Prieto and West Main Canals of the Colorado River Irrigation District in Colonia Wisteria, 4.3 miles upstream from the international boundary, 1.9 miles east of the highway to Tijuana at the Tijuana-San Felipe junction, 3.0 miles west of the highway to San Felipe, and 3.1 miles south of Mexicali. The wasteway structure is composed of three rectangular gates, two of which operate manually and one automatically.

**RECORDS:** Based on gate openings and water surface elevations upstream from the wasteway gates obtained by the Ministry of Hydraulic Resources and 49 check measurements during the year at various locations by the Mexican Section of the Commission. Records computed and furnished by the Mexican Section of the Commission. Records available: January 1951 through 1971. Records reported below are part of the waste flows from the Mexican system of canals discharging into the territory of the United States, which wastes are not to exceed an average annual quantity of 35,000 acre-feet during any successive five-year period under the provisions of Minute No. 197 of the Commission.

**EXTREMES:** Maximum instantaneous discharge, 675 second-feet on January 24, 1962; minimum discharge, no flow on various occasions.

### Mean Daily Discharge in Second Feet 1971 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.4	0	0	0	0	0	0	0	0	0	0	0
2	1.1	0	0	0	0	0	0	0	0	0	0	0
3	.7	0	0	0	0	0	0	0	0	0	0	0
4	.4	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0	0	0
Sum	3.5	0	0	0	0	0	0	0	0	0	0	0
Current Year 1971								Period 1951-1971				
Month	Extreme Gate Feet		Extreme Second Feet		Average Second Feet	Total Acre Feet	Acre Feet			Average	Maximum	Minimum
	High	Low	Day	Low								
Jan.			1	1.4	† 5	7.0	1,645	8,735	0			
Feb.			† 1	0	0	0	1,021	7,218	0			
Mar.			0	0	0	0	758	2,568	0			
Apr.			0	0	0	0	734	4,433	0			
May			0	0	0	0	516	1,892	0			
June			0	0	0	0	303	1,450	0			
July			0	0	0	0	239	2,040	0			
Aug.			0	0	0	0	464	1,926	0			
Sept.			0	0	0	0	643	2,915	0			
Oct.			0	0	0	0	880	2,993	0			
Nov.			0	0	0	0	983	3,768	0			
Dec.			0	0	0	0	1,445	8,669	0			
Yearly				1.4	0	0	7.0	9,630	27,083			7.0

† And other days

‡ Mean daily

## WASTE WATERS FROM MEXICAN SYSTEM OF CANALS ENTERING THE UNITED STATES

**DESCRIPTION:** During 1971, the discharge to the New River in Mexico was from Wisteria Wasteway, located 2.9 miles upstream from the international boundary in Colonia Wisteria, and from the Mexicali Potable Water Plant which discharges, by canal, into the Rivera Drain thence to New River.

**RECORDS:** Computations of flows from Wisteria Wasteway are based on gate openings and water-stage elevations upstream from the wasteway made by the Ministry of Hydraulic Resources, and of weekly measurements taken downstream from the weir by the Mexican Section of the Commission. Computation of flows from the Potable Water Plant are based on weekly readings from the discharge canal. Data obtained and furnished by the Mexican Section of the Commission. Records available: Wisteria Wasteway, January 1951 through 1971; Sifon Wasteway, January 1952 through April 1964; Pueblo Nuevo Wasteway, January 1956 through 1965; and the Potable Water Plant, January 1968 through 1971.

**REMARKS:** Mean daily discharges for Wisteria Wasteway and the Potable Water Plant are shown on pages 60 and 59, respectively in this bulletin. Records for Pueblo Nuevo and Sifon Wasteways are shown in previously published bulletins, 1960 through 1965; flows from these two wasteways are used for irrigation and no longer reach New River.

### Monthly Discharge in Acre-Feet

Month	Current Year 1971	Period 1956-1971		
		Average	Maximum	Minimum
January	320	1,583	8,758	15.4
February	311	1,070	7,281	19.6
March	253	669	2,610	21.7
April	229	480	2,843	16.1
May	362	337	1,141	9.1
June	403	246	1,477	0
July	394	173	394	0
August	596	383	1,413	0
September	549	454	2,081	21.0
October	502	593	2,024	8.4
November	354	834	3,784	0
December	277	1,493	8,691	0
Yearly	4,550	8,315	27,430	399

# SALTON SEA - ELEVATIONS OF WATER SURFACE

**DESCRIPTION:** Water-stage recorder and staff gage located on the western shore of the Salton Sea, 15.5 miles northwest of Westmoreland, Imperial County, California. The Salton Sea is the sink of a closed basin which has a drainage area of 8,360 square miles. Zero of the gage is 250.00 feet below mean sea level, U. S. C. & G. S. datum.

**RECORDS:** Records of water surface elevations available from November 1904 through 1971. From January 1925 to October 22, 1951, once monthly records of elevations were collected by Imperial Irrigation District from a bench mark at Figtree John's Spring about 22 miles northwest along the western shore from the present gage. Since October 24, 1951, a continuous record of gage heights has been obtained by the U. S. Geological Survey at new gaging station published as "Salton Sea near Westmoreland, California". The elevation of the old station is at a datum of one foot higher than that of the present station. All records reported below and the area and capacity table are adjusted to the datum of the present station.

**REMARKS:** Runoff from the basin, irrigation drainage and waste water from Imperial and Coachella Valleys in the United States, and drainage and waste water from part of the Mexicali Valley in Mexico discharge into the Salton Sea. Water from Mexico enters the United States in the Alamo and New River channels. The bottom of the sea is 277.7 feet below mean sea level, U. S. C. & G. S. datum.

**EXTREMES:** Maximum elevation during year, 231.7 feet below mean sea level. Minimum elevation during year, 232.6 feet below mean sea level. Extremes for period of record, maximum elevation 195.9 feet below mean sea level, February 10 to March 29, 1907; minimum elevation since 1906, 251.6 feet below mean sea level in November 1924.

## Mean Daily Water Surface Elevation in Feet below Mean Sea Level - 1971

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	232.6	232.3	232.0	231.8	231.8	231.9	231.9	232.1	232.3	232.5	232.6	232.5
2	232.6	232.3	232.0	231.8	231.8	231.9	231.9	232.1	232.3	232.5	232.6	232.5
3	232.6	232.3	232.0	231.8	231.8	231.9	231.9	232.1	232.3	232.5	232.6	232.5
4	232.6	232.3	232.0	231.8	231.8	231.9	231.9	232.1	232.3	232.5	232.6	232.5
5	232.5	232.3	232.0	231.8	231.8	231.9	231.9	232.1	232.3	232.5	232.6	232.5
6	232.5	232.3	232.0	231.7	231.8	231.9	231.9	232.1	232.3	232.5	232.6	232.5
7	232.5	232.2	232.0	231.7	231.8	231.9	232.0	232.1	232.3	232.5	232.6	232.5
8	232.5	232.2	232.0	231.7	231.8	231.9	232.0	232.1	232.3	232.5	232.6	232.5
9	232.5	232.2	232.0	231.7	231.8	231.9	232.0	232.1	232.3	232.5	232.6	232.5
10	232.5	232.2	232.0	231.7	231.8	231.9	232.0	232.1	232.3	232.5	232.6	232.5
11	232.5	232.2	232.0	231.7	231.8	231.9	232.0	232.1	232.4	232.5	232.6	232.5
12	232.5	232.2	232.0	231.7	231.8	231.9	232.0	232.1	232.4	232.5	232.6	232.5
13	232.5	232.2	231.9	231.7	231.8	231.9	232.0	232.1	232.4	232.5	232.6	232.5
14	232.5	232.2	231.9	231.7	231.8	231.9	232.0	232.1	232.4	232.5	232.6	232.5
15	232.5	232.1	231.9	231.7	231.8	231.9	232.0	232.1	232.4	232.5	232.6	232.5
16	232.5	232.1	231.9	231.7	231.8	231.9	232.0	232.1	232.4	232.5	232.6	232.5
17	232.5	232.1	231.9	231.7	231.8	231.9	232.0	232.1	232.4	232.5	232.6	232.5
18	232.5	232.1	231.9	231.8	231.8	231.9	232.0	232.1	232.4	232.5	232.6	232.5
19	232.5	232.1	231.9	231.8	231.8	231.9	232.0	232.1	232.4	232.5	232.6	232.5
20	232.5	232.1	231.9	231.8	231.8	231.9	232.0	232.1	232.4	232.5	232.6	232.5
21	232.4	232.1	231.8	231.8	231.8	231.9	232.1	232.2	232.4	232.6	232.5	232.4
22	232.4	232.1	231.8	231.8	231.8	231.9	232.1	232.2	232.4	232.6	232.5	232.4
23	232.4	232.1	231.8	231.8	231.8	231.9	232.1	232.2	232.4	232.6	232.5	232.4
24	232.4	232.1	231.8	231.8	231.8	231.9	232.1	232.2	232.4	232.6	232.5	232.4
25	232.4	232.0	231.8	231.8	231.8	231.9	232.1	232.2	232.4	232.6	232.5	232.4
26	232.4	232.0	231.8	231.8	231.8	231.9	232.1	232.2	232.5	232.6	232.5	232.4
27	232.4	232.0	231.8	231.8	231.8	231.9	232.1	232.2	232.5	232.6	232.5	232.4
28	232.4	232.0	231.8	231.8	231.8	231.9	232.1	232.2	232.5	232.6	232.5	232.4
29	232.4	231.8	231.8	231.8	231.8	231.9	232.1	232.2	232.5	232.6	232.5	232.4
30	232.3	231.8	231.8	231.8	231.9	231.9	232.1	232.2	232.5	232.6	232.5	232.4
31	232.3	231.8	231.8	231.8	231.9	231.9	232.1	232.2	232.5	232.6	232.5	232.3
Avg.	232.5	232.2	231.9	231.8	231.8	231.9	232.0	232.1	232.4	232.5	232.5	232.5

Current Year 1971			Period 1935-1971			Area and Capacity Table		
Month	Extreme Elev. Feet		Elevation Feet			Elevation	Area	Capacity
	High	Low	Average	# Max.	‡ Min.	Feet below M.S.L.	Acres	Acres-Feet
Jan.	232.3	232.6	238.63	232.05	249.3	277.7	0	0
Feb.	232.0	232.3	239.42	231.79	248.8	274.0	20,600	25,700
Mar.	231.8	232.0	238.05	231.57	248.6	270.0	62,900	168,700
Apr.	231.7	231.8	237.87	231.39	248.7	266.0	94,600	510,600
May	231.8	231.9	237.86	231.54	248.5	260.0	122,600	1,170,000
June	231.9	231.9	238.03	231.71	248.8	256.0	134,700	1,684,000
July	231.9	232.1	236.19	231.92	249.1	252.0	143,800	2,250,000
Aug.	232.1	232.2	238.39	232.17	249.4	244.0	179,700	3,562,000
Sept.	232.3	232.5	238.58	232.49	249.4	240.0	196,900	4,315,000
Oct.	232.5	232.6	238.66	232.49	249.8	235.0	221,800	5,360,000
Nov.	232.5	232.6	238.65	232.30	250.0	230.0	235,800	6,504,000
Dec.	232.3	232.6	238.49	232.23	249.6	220.0	262,000	8,993,000
Yearly	231.7	232.6	238.14	232.06	250.0	210.0	288,500	11,740,000
						200.0	315,500	14,760,000

§ Mean daily

# Mean monthly

‡ Reading near first day of month

## CHEMICAL ANALYSES OF WATER SAMPLES

### 1971

The tables below are based on quarterly samples from the Alamo and New Rivers taken and analyzed by the State of California Department of Water Resources. Beginning December 1971, not all constituents analyzed.

Samples from the Alamo River are taken north of the international boundary at upstream end of box culvert under the All-American Canal. Flow at this point includes drainage flows across international boundary and flows from drain intercepts along toe of south bank of All-American Canal. Samples from New River are taken from the right bank at road bridge 450 feet north of international boundary. Records of sampling extend from April 1951 through 1971.

To convert milligram equivalents to parts per million by weight, multiply each ion by its appropriate conversion factor. These factors are: Ca, 20.04; Mg, 12.16; Na, 22.99; (CO<sub>3</sub> plus HCO<sub>3</sub>) expressed as CO<sub>3</sub>, 30.00; SO<sub>4</sub>, 48.03; Cl, 35.45; NO<sub>3</sub>, 62.00. To convert tons per acre-foot to parts per million, multiply tons per acre-foot by 735.5. Electrical conductivity, reported in the tables as ECX10<sup>6</sup> at 25°C, is a relative measure of the total salt concentration.

Month	No. of Samples	Dissolved Solids		ECx10 <sup>6</sup> @25°C	Boron p.p.m.	pH	% Na **	% Cl ***	Mean Milligram Equivalents per Liter						
		Tons Per Acre-Foot	Total Tons						Ca	Mg	Na	CO <sub>3</sub> + HCO <sub>3</sub>	SO <sub>4</sub>	Cl	NO <sub>3</sub>

#### Alamo River

Jan.															
Feb.															
Mar.	1	2.94		3,281	0.82	7.8	57	44	7.83	6.91	19.49	4.38	14.40	15.09	0.06
Apr.															
May															
June	1	3.36		3,533	.84	8.3	56	49	9.43	7.89	21.75	4.08	15.72	19.15	.06
July															
Aug.															
Sept.	1	2.54		2,852	.66	7.7	55	45	7.19	6.08	16.31	4.27	12.01	13.54	.06
Oct.															
Nov.															
Dec.*	1	3.02		3,600		7.9							14.44	16.22	
Total	4														

#### New River

Jan.															
Feb.															
Mar.	1	5.74		6,560		7.2	65	67	4.59	18.74	43.94	5.30	17.12	44.98	0.08
Apr.															
May															
June	1	5.29		6,427		7.7	70	74	9.68	10.77	46.93	13.86	3.89	49.53	.02
July															
Aug.															
Sept.	1	5.51		6,234		7.3	65	68	12.18	10.52	42.85	4.98	16.35	44.83	.02
Oct.															
Nov.															
Dec.*	1	6.31											14.93	54.85	
Total	4														

\* Partial analysis

\*\* Percent of total cations

\*\*\* Percent of total anions

**ELECTRICAL CONDUCTIVITY OF WATER SAMPLES****1971**

The following tables show electrical conductivity expressed in mhos per centimeter  $\times 10^6$  at 25°C of individual water samples from the wasteway canal at the Potable Water Plant in Mexicali, Baja California and the New River in Mexico at the international boundary. Samples from the Potable Water Plant and the New River are taken by the Mexican Section of the Commission, and determinations are made by the Ministry of Hydraulic Resources of Mexico.

Electrical conductivity is a relative indication of the concentration of dissolved solids in the water samples.

Date	ECx10 <sup>6</sup> @25°C	Date	ECx10 <sup>6</sup> @25°C	Date	ECx10 <sup>6</sup> @25°C	Date	ECx10 <sup>6</sup> @25°C	Date	ECx10 <sup>6</sup> @25°C	Date	ECx10 <sup>6</sup> @25°C	Date	ECx10 <sup>6</sup> @25°C	Date	ECx10 <sup>6</sup> @25°C	Date	ECx10 <sup>6</sup> @25°C
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**Mexicali Potable Water Plant to New River**

January	February	April	June	July	September	October	November
5 2600	20 2100	3 1900	5 2150	24 2300	4 2100	16 1900	27 2200
16 1900	March	30 2050	11 2000	30 2200	10 2000	23 2000	December
30 1875	6 2000	May	18 2100	August	18 2000	30 1900	4 2000
February	13 2000	8 2000	July	6 2200	25 2000	November	11 2000
6 1850	20 2000	13 2000	2 2000	14 2125	October	6 1900	18 2150
13 2200	27 1950	22 1950	9 1900	21 2125	2 1800	13 1900	31 2100
	31 2200		16 1700	28 1600	9 1850		

**New River at International Boundary**

January	February	April	June	July	September	October	November
5 7500	20 6500	3 6500	5 6500	24 6000	4 5900	16 5000	27 6500
16 6500	March	30 6000	11 6500	31 6000	10 6000	23 6500	December
30 7250	6 6000	May	18 6500	August	18 6250	30 6500	4 6500
February	13 6100	8 6500	July	6 6000	25 6000	November	11 6250
6 6100	20 6500	22 6500	2 6500	14 6500	October	6 6500	18 7000
13 6500	27 6500	29 6500	9 6000	21 6400	2 6500	13 6500	31 7000
	31 6500		17 6000	28 4900	9 6000	19 6500	

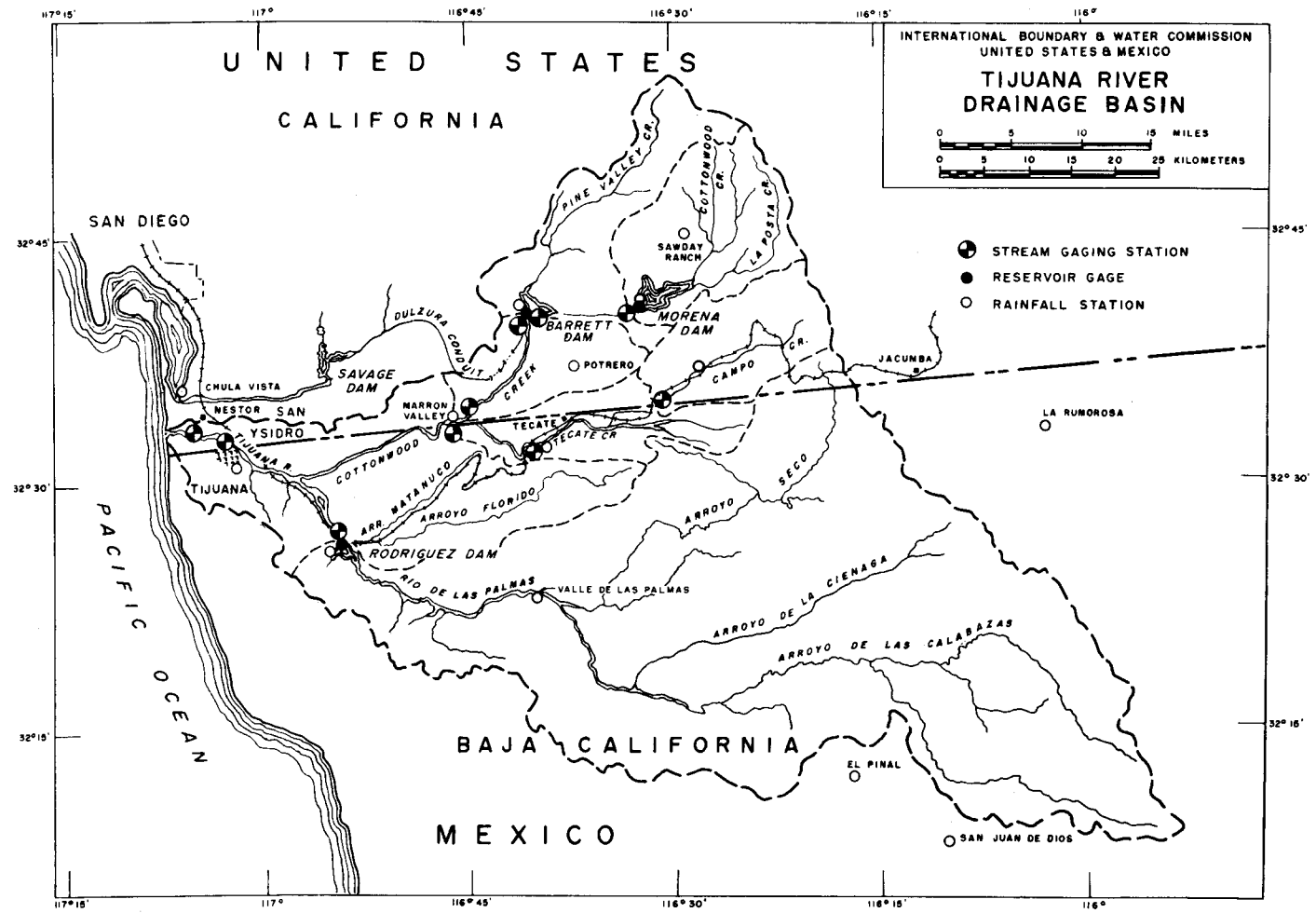


INTERNATIONAL BOUNDARY & WATER COMMISSION  
 UNITED STATES & MEXICO

### TIJUANA RIVER DRAINAGE BASIN

0 5 10 15 MILES

0 5 10 15 20 25 KILOMETERS



## COTTONWOOD CREEK ABOVE MORENA DAM, CALIFORNIA

**DESCRIPTION:** Staff gage located on east side of outlet tower immediately upstream from face of Morena Dam. The dam is located on Cottonwood Creek 1.8 miles upstream from the mouth of Hauser Creek, 8.5 miles upstream from Barrett Dam, and about 20 miles upstream from the international boundary. Zero of gage is 2,882.4 feet above mean sea level, U. S. C. & G. S. datum.

**RECORDS:** Reservoir inflows shown below were computed from monthly reservoir records of storage, releases, spills, leakage, evaporation, and rainfall, by the International Boundary and Water Commission, United States Section. They represent all water reaching Morena Reservoir, including rainfall on reservoir water surface. Basic data were furnished by the city of San Diego, California. Records available: April 1911 through 1971.

**REMARKS:** Storage began in Morena Reservoir March 1910. Reservoir capacity and area ratings date from 1910 when Morena Dam was completed. Records for 1971 computed on basis of area-capacity curves determined from 1948 resurvey. Various changes have been made to the spillway section since construction of the dam. Elevation of present crest of ungated spillway is 157.00 feet, gage datum. Reservoir capacity at spillway crest, 1948 survey, is 50,210 acre-feet. The entire capacity of Morena Reservoir is used to furnish a part of the water supply of the city of San Diego, California. Water is released from Morena Reservoir down Cottonwood Creek to Barrett Reservoir as required.

**EXTREMES:** Prior to 1937, maximum monthly inflow, 37,200 acre-feet, January 1916; minimum, no flow during parts of many years.

### Monthly Discharge in Acre-Feet

Month	Current Year 1971	Period 1937-1971		
		Average	Maximum	Minimum
January	33.7	459	3,520	4.8
February	69.0	1,131	16,700	8.0
March	67.2	1,682	13,220	19.3
April	23.4	1,067	11,490	3.3
May	47.6	378	3,550	0
June	37.0	193	1,660	0
July	6.0	136	1,010	0
August	96.0	99.6	1,260	0
September	5.0	67.9	1,070	0
October	61.0	79.9	1,270	0
November	3.3	146	1,380	0
December	209	485	3,590	4.4
Yearly	658.2	5,924.4	39,439	121

**COTTONWOOD CREEK BELOW MORENA DAM, CALIFORNIA**

**DESCRIPTION:** Two water-stage recorders, one on the upstream side of the southeast abutment of Morena Dam for measuring head on the spillway crest and one immediately below the dam with a rectangular control weir for measuring ordinary reservoir releases, and cableway located about 0.8 mile downstream from the dam. Discharge measurements made at the cableway include leakage, controlled releases, and spillway discharges.

**RECORDS:** Monthly records shown below represent the water available immediately below Morena Dam, consisting of spillway waste, draft, and leakage from the dam. They are computed by the International Boundary and Water Commission, United States Section, from basic data furnished by the city of San Diego, California. Records available: January 1911 through 1971.

**REMARKS:** Flows at this station are regulated by Morena Dam; storage began March 1910. Water is released from Morena Reservoir as required and flows down the natural channel of Cottonwood Creek to Barrett Reservoir. There are no major diversions above Morena Dam.

**EXTREMES:** Prior to 1937, maximum monthly discharge, 21,400 acre-feet, February 1916; minimum, zero during December 1936.

**Monthly Discharge in Acre-Feet**

Month	Current Year 1971	Period 1937-1971		
		Average	Maximum	Minimum
January	0.2	124	1,700	0.2
February	6.1	348	4,260	.2
March	0	283	1,731	0
April	0	863	12,950	0
May	0	235	3,040	0
June	0	323	7,360	0
July	0	184	2,340	0
August	0	153	1,550	0
September	0	301	5,880	0
October	0	89.4	529	0
November	23.7	121	1,260	0
December	0	334	5,350	0
Yearly	30.0	3,358.4	24,825	15.6

## COTTONWOOD CREEK ABOVE BARRETT DAM, CALIFORNIA

**DESCRIPTION:** Staff gage located immediately upstream from face of dam on west side of outlet tower. Barrett Dam is located on Cottonwood Creek 8.5 miles downstream from Morena Dam, 1 mile downstream from the mouth of Pine Valley Creek and about 12 miles upstream from the international boundary. Zero of gage is 1,446.12 feet above mean sea level, U. S. C. & G. S. datum.

**RECORDS:** Records reported below represent all water reaching Barrett Dam from the sub-basin below Morena Dam including rainfall on the reservoir water surface. Leakage, releases, and spills from Morena Reservoir are not included. The inflows were computed from monthly reservoir records of storage, releases, spills, leakage, evaporation and rainfall furnished by the city of San Diego, California. Records available: January 1921 through 1971. Records of stream flow for a station at the dam site are also available for the periods 1906-1915 and 1917-1920.

**REMARKS:** Storage began at Barrett Reservoir in January 1921. The area-capacity-elevation curves used in the inflow calculations are dated 1948, 1951 and 1955 and were furnished by the city of San Diego, California. Capacity of reservoir at top of flash gates on spillway (gage height, 168.88) is 44,755 acre-feet. Capacity at spillway crest (gage height, 160.88 feet) is 37,950 acre-feet. Dead storage, 719 acre-feet below lowest outlet (gage height, 58.88 feet) is included in these capacities. The entire capacity of Barrett Reservoir is used to furnish a part of the water supply of the city of San Diego, California.

**EXTREMES:** Prior to 1937, maximum monthly discharge, 54,800 acre-feet, February 1927; minimum, no flow during several months of various years.

### Monthly Discharge in Acre-Feet

Month	Current Year 1971	Period 1937-1971		
		Average	Maximum	Minimum
January	171	597	3,430	5.2
February	130	1,642	26,790	7.6
March	115	2,702	18,860	14.1
April	79.8	1,787	21,630	10.2
May	60.9	548	5,130	0
June	8.6	225	1,730	0
July	3.9	144	1,010	0
August	10.7	86.9	579	0
September	1.0	99.4	759	0
October	9.1	62.8	645	.1
November	3.0	130	1,200	0
December	84.3	493	3,380	5.5
<b>Yearly</b>	<b>677.3</b>	<b>8,517.3</b>	<b>59,387</b>	<b>129</b>

**DULZURA CONDUIT BELOW BARRETT DAM, CALIFORNIA**

**DESCRIPTION:** Water-stage recorder 0.5 mile downstream from Barrett Dam on right bank of Dulzura Conduit 50 feet upstream from road crossing to Barrett Dam. Elevation of gage has not been determined.

**RECORDS:** Computed on basis of head on control section of flume, as measured by water-stage recorder, and rating curve determined from current meter measurements. Records obtained and furnished by the city of San Diego, California. Records available: January 1909 through 1971.

**REMARKS:** Barrett Dam was completed in 1921. Prior to this date the intake of Dulzura Conduit was located 1.5 miles upstream. The conduit carries diversions from Barrett Reservoir on Cottonwood Creek westerly across the divide into Otay Reservoir for municipal use by the city of San Diego. Prior to September 30, 1958, station was located 8 miles along the conduit from Barrett Dam, being reported as "Dulzura Conduit Near Dulzura" and the draft from Barrett Reservoir was computed from the discharges obtained at the conduit gaging station, multiplied by the factor 1.05 to allow for channel losses in the reach from the reservoir to the gaging station.

**EXTREMES:** Since 1937: Maximum mean daily discharge, 55 second-feet on March 15, 1954; minimum discharge, no flow for long periods on many occasions.

**Mean Daily Discharge in Second Feet 1971 — Annual and Period Summary**

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0	0	0
Sum	0	0	0	0	0	0	0	0	0	0	0	0
Current Year 1971												
Month	Extreme Gage Feet		Extreme Second Feet				Average Second Feet	Total Acre Feet	Period 1937-1971			
	High	Low	High	Day	Low	Average			Maximum	Minimum		
Jan.							0	406	2,350	0		
Feb.							0	408	2,130	0		
Mar.							0	547	2,330	0		
Apr.							0	880	2,860	0		
May							0	1,003	3,040	0		
June							0	1,019	2,920	0		
July							0	842	2,920	0		
Aug.							0	729	2,820	0		
Sept.							0	473	2,320	0		
Oct.							0	362	2,450	0		
Nov.							0	499	2,760	0		
Dec.							0	461	2,305	0		
Yearly							0	7,629	27,170	0		

## COTTONWOOD CREEK BELOW BARRETT DAM, CALIFORNIA

**DESCRIPTION:** Water-stage recorder and cableway located about 2.5 miles downstream from Barrett Dam and 0.5 mile upstream from Rattlesnake Canyon for measuring Barrett Dam spills, and staff gage and control weir located immediately below the dam for measuring leakage. The elevation of the gage is about 1,000 feet (from topographic map).

**RECORDS:** Data furnished by the city of San Diego, California. Prior to January 1953, the records were furnished by the city of San Diego and reviewed and revised by the United States Section of the Commission. The recorder is to be operated only when Barrett Reservoir is near or above spillway level. There have been no spillway discharges since May 1943. Spillway discharges included in the period record below were computed by the city of San Diego from the head on the spillway crest, read on the reservoir gage, and applied to a broad-crested weir formula. Records available: January 1921 through 1971. Storage began in Barrett Reservoir in January 1921.

**REMARKS:** Records reported below represent the water available in the natural channel of Cottonwood Creek immediately below Barrett Dam. Records of draft from Barrett Reservoir are not included inasmuch as all releases are made to Dulzura Conduit which transports water outside the basin. Leakage is mainly through the spillway gates.

**EXTREMES:** Prior to 1937, maximum monthly discharge 38,400 acre-feet February 1927; minimum, no flow during several months of various years.

### Monthly Discharge in Acre-Feet

Month	Current Year 1971	Period 1937-1971		
		Average	Maximum	Minimum
January	0	17.2	590	0
February	0	29.4	990	0
March	0	791	13,390	0
April	0	1,161	33,400	0
May	0	263	7,520	0
June	0	37.1	890	0
July	0	2.1	21	0
August	0	1.8	21	0
September	0	1.5	21	0
October	0	1.2	21	0
November	0	1.0	15	0
December	0	1.5	21	0
Yearly	0	2,307.8	50,364	0

## COTTONWOOD CREEK ABOVE TECATE CREEK NEAR DULZURA, CALIFORNIA

DESCRIPTION: Water-stage recorder and cableway located 1.6 miles upstream from the international land boundary between the United States and Mexico, 0.8 mile upstream from the confluence with Tecate Creek, and 5.1 miles south of Dulzura, California. Low water discharge measurements are made by wading at the gage; high water measurements are made from the cableway which is located 700 feet downstream from the gage. Zero of gage is 569.40 feet above mean sea level, U. S. C. & G. S. datum.

RECORDS: Based on a continuous record of gage heights and current meter measurements or observation of no flow generally made twice each month. Records obtained and furnished by the U. S. Geological Survey. Records available: October 1936 through 1971.

REMARKS: Flow is largely controlled by Barrett and Morena Reservoirs, 10 and 18 miles, respectively, upstream from this station. During 1971, there were no releases or spills to the natural channel of Cottonwood Creek at Barrett Dam, the lowermost dam in Cottonwood Creek Basin.

EXTREMES: Maximum discharge 4,340 second-feet February 7, 1937 (gage height 9.65 feet), from rating curve extended above 1,500 second-feet by logarithmic plotting. Minimum discharge, no flow during part of each year.

## Mean Daily Discharge in Second Feet 1971 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.06	0.08	0.22	0.03	0.04	0	0	0	0	0	0	0
2	2.00	.07	.13	.01	.03	0	0	0	0	0	0	0
3	.77	.07	.10	0	.02	0	0	0	0	0	0	0
4	.27	.06	.12	0	.01	0	0	0	0	0	0	0
5	.21	.07	.11	0	.01	0	0	0	0	0	0	0
6	.19	.07	.07	0	.01	0	0	0	0	0	0	0
7	.17	.08	.04	0	.07	0	0	0	0	0	0	0
8	.19	.08	.03	0	.25	0	0	0	0	0	0	0
9	.19	.07	.04	0	.14	0	0	0	0	0	0	0
10	.19	.06	.06	0	.09	0	0	0	0	0	0	0
11	.19	.05	.09	0	.05	0	0	0	0	0	0	0
12	.19	.05	.09	0	.04	0	0	0	0	0	0	0
13	.32	.05	.47	0	.03	0	0	0	0	0	0	0
14	.20	.05	.47	0	.02	0	0	0	0	0	0	0
15	.14	.06	.37	0	.01	0	0	0	0	0	0	0
16	.12	.12	.25	0	0	0	0	0	0	0	0	0
17	.10	.96	.22	0	0	0	0	0	0	0	0	0
18	.09	.61	.17	.12	0	0	0	0	0	0	0	0
19	.06	.37	.10	.12	0	0	0	0	0	0	0	0
20	.06	.45	.10	.07	0	0	0	0	0	0	0	0
21	.07	.24	.09	.07	0	0	0	0	0	0	0	0
22	.10	.22	.07	.06	0	0	0	0	0	0	0	0
23	.09	.71	.09	.04	0	0	0	0	0	0	0	0
24	.08	.58	.10	.03	0	0	0	0	0	0	0	0
25	.09	.37	.10	.04	0	0	0	0	0	0	0	0
26	.08	.23	.10	.07	0	0	0	0	0	0	0	0
27	.07	.18	.09	.09	0	0	0	0	0	0	0	0
28	.06	.17	.07	.07	0	0	0	0	0	0	0	0
29	.06		.06	.07	0	0	0	0	0	0	0	0
30	.06		.05	.05	0	0	0	0	0	0	0	0
31	.06		.04		0	0	0	0	0	0	0	0
Sum	6.53	6.18	4.11	0.94	0.82	0	0	0	0	0	0	0
Current Year 1971								Period 1937-1971				
Month	Extreme Gage Feet		Ø	Extreme Second Feet		Average Second Feet	Total Acre Feet	Acre Feet				
	High	Low		High	Low			Average	Maximum	Minimum		
Jan.			2	2.0	† 1	0.06	0.21	13	200	1,190		0
Feb.			17	.96	† 11	.05	.22	12.3	639	9,940		0
Mar.			† 13	.47	8	.03	.13	8.2	1,707	20,880		0
Apr.			† 18	.12	† 3	0	.031	1.9	1,610	40,240		0
May			8	.25	† 16	0	.027	1.6	374	10,040		0
June				0		0	0		71.1	1,590		0
July				0		0	0		8.0	206		0
Aug.				0		0	0		.4	7.7		0
Sept.				0		0	0		2.1	72		0
Oct.				0		0	0		4.1	101		0
Nov.				0		0	0		22.6	440		0
Dec.				0		0	0		145	1,316		0
Yearly				2.0		0	0.05	37.0	4,783.3	66,700		0

† And other days

Ø Mean daily

## CAMPO CREEK NEAR CAMPO, CALIFORNIA

**DESCRIPTION:** Water-stage recorder and broad-crested weir on left bank, 0.5 mile upstream from the international land boundary between the United States and Mexico, just upstream from bridge on California State Highway 94, 3.5 miles southwest of Campo, California. Low water discharge measurements are made by wading at the gage; high water measurements are made from the bridge. Zero of gage is 2,176.92 feet above mean sea level, U. S. C. & G. S. datum.

**RECORDS:** Based on current meter measurements and observation of no flow. Records obtained and furnished by the U. S. Geological Survey. Records available: October 1936 through 1971.

**REMARKS:** Campo Creek originates in the United States and flows southwestward into Mexico where it joins Tecate Creek. The flow at this station is partially regulated by a small conservation reservoir a quarter of a mile upstream, completed in August 1956.

**EXTREMES:** Maximum instantaneous discharge during 1971, 12.0 c. f. s. on August 10 (gage height 1.82 feet); no flow October 7, 8, 10-13. Maximum discharge 880 second-feet, February 6, 1937 (gage height 4.80 feet, present datum), from rating curve extended above 110 second-feet on basis of velocity-depth relation and cross-section area at the control. Minimum discharge, no flow during part of most years.

## Mean Daily Discharge in Second Feet 1971 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.09	0.09	0.11	0.08	0.06	0.06	0.09	0.03	0.02	0.02	0.02	0.03
2	.20	.09	.10	.09	.06	.07	.08	.02	.02	.02	.02	.03
3	.09	.10	.09	.09	.06	.07	.08	.01	.02	.02	.02	.04
4	.09	.08	.08	.08	.06	.07	.08	.02	.02	.02	.02	.06
5	.09	.09	.08	.08	.07	.07	.05	.02	.02	.01	.02	.05
6	.09	.09	.06	.07	.07	.06	.05	.01	.02	.01	.02	.05
7	.09	.07	.07	.09	.06	.05	.04	.01	.02	0	.02	.05
8	.09	.07	.06	.09	.07	.05	.04	.01	.02	0	.02	.05
9	.09	.07	.06	.10	.05	.06	.04	.01	.02	.01	.02	.05
10	.09	.06	.06	.09	.05	.06	.04	.20	.02	0	.03	.05
11	.09	.06	.06	.09	.05	.05	.04	.04	.01	0	.03	.05
12	.09	.06	.06	.08	.05	.05	.04	.03	.01	0	.03	.05
13	.10	.06	.10	.09	.05	.04	.03	.02	.01	0	.03	.06
14	.09	.06	.10	.15	.05	.04	.04	.02	.01	.01	.03	.05
15	.09	.06	.09	.15	.05	.04	.04	.01	.01	.01	.03	.05
16	.09	.09	.08	.10	.06	.05	.06	.02	.02	.03	.03	.05
17	.09	.15	.09	.09	.06	.06	.05	.02	.02	.04	.03	.05
18	.09	.13	.07	.15	.05	.06	.05	.03	.01	.03	.03	.05
19	.03	.11	.08	.09	.05	.06	.05	.04	.01	.02	.03	.05
20	.09	.12	.09	.07	.06	.06	.05	.04	.03	.02	.03	.05
21	.09	.11	.09	.06	.08	.06	.05	.04	.03	.02	.03	.05
22	.09	.11	.08	.08	.08	.06	.05	.04	.02	.02	.03	.07
23	.09	.15	.08	.11	.06	.07	.04	.03	.02	.02	.03	.05
24	.09	.12	.09	.11	.05	.08	.04	.03	.02	.02	.03	.05
25	.09	.11	.08	.13	.05	.09	.04	.02	.03	.02	.03	.07
26	.06	.10	.08	.10	.05	.09	.04	.02	.03	.02	.03	.05
27	.06	.10	.08	.10	.06	.09	.04	.02	.04	.02	.03	.06
28	.06	.11	.10	.10	.10	.07	.03	.02	.03	.03	.03	.05
29	.05		.10	.07	.10	.07	.04	.02	.03	.02	.03	.05
30	.06		.10	.05	.07	.09	.03	.02	.02	.02	.03	.05
31	.09		.10		.07		.03	.02		.02		.05
Sum	2.74	2.62	2.57	2.83	1.91	1.90	1.47	0.89	0.61	0.50	0.81	1.57
Current Year 1971												
Month	Extreme Gage Feet		Extreme Second Feet				Average Second Feet	Total Acre Feet	Period 1937-1971			
	High	Low	Day	High	Low	Acre Feet						
Average						Maximum	Minimum					
Jan.			2	0.20	29	0.05	0.088	5.4	134	906	0	
Feb.			†17	.15	†10	.06	.094	5.2	237	1,730	0	
Mar.			1	.11	†6	.06	.083	5.1	339	2,360	0	
Apr.			†14	.15	30	.05	.094	5.6	238	3,250	0	
May			†28	.10	†9	.05	.062	3.8	109	1,540	0	
June			†25	.09	†13	.04	.063	3.3	43.0	719	0	
July			1	.09	†13	.03	.047	2.9	17.4	361	0	
Aug.			10	.20	†3	.01	.029	1.8	12.8	321	0	
Sept.			27	.04	†11	.01	.020	1.2	12.1	264	0	
Oct.			17	.04	†7	0	.016	1.0	21.0	543	0	
Nov.			†10	.03	†1	.02	.027	1.6	38.7	542	0	
Dec.			†22	.07	†1	.03	.051	3.1	107	809	0	
Yearly				0.20		0	0.056	40.5	1,309	11,141	0	

δ Mean daily

† And other days



## COTTONWOOD CREEK NEAR INTERNATIONAL BOUNDARY

**DESCRIPTION:** Water-stage recorder and cableway, 0.6 mile upstream from the international land boundary between the United States and Mexico, 0.5 mile downstream from the confluence of Cottonwood Creek and Tecate Creek, and 5.5 miles south of Dulzura, California. Low water discharge measurements are made by wading at the gage. Zero of gage is 542.42 feet above mean sea level, U. S. C. & G. S. datum.

**RECORDS:** Based on a continuous record of gage heights and current meter measurements or observation of no flow generally made twice each month. Records obtained and furnished by the U. S. Geological Survey. Records available: October 1936 through 1971.

**REMARKS:** Flow is partially controlled by Barrett and Morena Reservoirs, 11 and 19 miles respectively, upstream from this station. The flow at this station represents the amount of water passing the Marron Dam site.

**EXTREMES:** Maximum discharge, 4,700 second-feet, February 7, 1937 (gage height 8.50 feet) from rating curve extended above 300 second-feet on basis of velocity, mean-depth and area computations. Minimum discharge, no flow for part of most years.

## Mean Daily Discharge in Second Feet 1971 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.28	0.32	0.35	0.19	0.23	0.13	0.16	0.07	0.05	0.08	0.12	0.18
2	6.1	.33	.34	.18	.23	.15	.15	.06	.05	.08	.12	.15
3	3.7	.30	.32	.17	.21	.15	.15	.07	.05	.08	.12	.18
4	.75	.30	.32	.17	.22	.14	.17	.06	.05	.07	.12	.21
5	.57	.34	.29	.16	.21	.14	.18	.06	.04	.07	.12	.18
6	.46	.32	.24	.15	.21	.12	.17	.06	.04	.04	.12	.18
7	.38	.30	.24	.16	.23	.12	.17	.05	.05	.03	.12	.18
8	.40	.31	.25	.15	.21	.13	.16	.05	.04	.03	.12	.18
9	.45	.33	.21	.16	.17	.11	.18	.04	.04	.03	.12	.18
10	.47	.35	.19	.19	.13	.12	.16	.04	.03	.03	.12	.18
11	.48	.29	.17	.18	.14	.11	.14	.04	.02	.01	.12	.15
12	.52	.30	.15	.17	.13	.10	.12	.03	.02	.01	.15	.15
13	.70	.30	.26	.21	.13	.13	.13	.04	.01	.01	.12	.18
14	.75	.23	.55	.20	.13	.12	.15	.04	.01	.02	.12	.18
15	.52	.23	.40	.17	.13	.11	.14	.05	.01	.04	.12	.18
16	.37	.23	.28	.19	.15	.10	.19	.05	.03	.08	.12	.18
17	.37	1.3	.24	.22	.13	.11	.15	.04	.04	.10	.12	.18
18	.37	1.9	.19	.24	.14	.10	.12	.05	.04	.10	.15	.18
19	.37	1.0	.16	.24	.15	.10	.11	.05	.04	.10	.12	.15
20	.37	1.3	.17	.24	.14	.11	.11	.05	.04	.10	.12	.15
21	.36	.82	.15	.25	.14	.11	.10	.04	.05	.08	.12	.15
22	.36	.54	.15	.23	.13	.11	.09	.05	.05	.08	.12	.25
23	.32	1.2	.13	.20	.13	.11	.10	.05	.05	.10	.12	.21
24	.29	1.6	.11	.20	.14	.11	.10	.04	.04	.10	.15	.21
25	.28	.93	.13	.23	.14	.12	.09	.05	.05	.12	.15	.21
26	.28	.62	.19	.21	.15	.12	.08	.05	.06	.12	.12	.34
27	.32	.48	.21	.22	.14	.15	.10	.05	.06	.12	.12	.25
28	.32	.37	.22	.21	.15	.15	.09	.04	.06	.15	.15	.34
29	.34		.23	.21	.15	.15	.09	.04	.07	.15	.15	.29
30	.33		.20	.23	.14	.15	.09	.05	.09	.15	.15	.25
31	.32		.22		.13		.07	.05		.12		.21
Sum	21.90	16.84	7.26	5.93	4.96	3.68	4.01	1.51	1.29	2.40	3.81	6.19
Current Year 1971												
Month	Extreme Gage Feet		Extreme Second Feet				Average Second Feet	Total Acre Feet	Period 1937-1971			
	High	Low	Day		Day	Low			Average	Maximum	Minimum	
Jan.			2	6.1	† 1	0.28	0.71	43.4	425	2,750	0	
Feb.			18	1.9	† 14	.23	.60	33.4	1,149	13,680	0	
Mar.			14	.55	24	.11	.23	14.4	2,711	27,140	0	
Apr.			21	.25	† 6	.15	.20	11.8	2,201	51,060	0	
May			† 1	.23	† 10	.13	.16	9.8	556	14,110	0	
June			† 2	.15	† 12	.10	.12	7.3	114	2,630	0	
July			16	.19	31	.07	.13	8.0	18.6	312	0	
Aug.			† 1	.07	12	.03	.049	3.0	6.8	171	0	
Sept.			30	.09	† 13	.01	.043	2.6	9.4	152	0	
Oct.			† 28	.15	† 11	.01	.077	4.8	23.6	705	0	
Nov.			† 12	.15	† 1	.12	.13	7.6	45.9	639	0	
Dec.			† 26	.34	† 2	.15	.20	12.3	356	3,330	0	
Yearly				6.1		0.01	0.22	158.4	7,629.3	97,900	0	

† And other days

‡ Mean daily

## INFLOWS TO RODRIGUEZ RESERVOIR, BAJA CALIFORNIA

**DESCRIPTION:** Rodriguez Dam is located in Mexico on Rio de las Palmas, the principal tributary to the Tijuana River, about 5.5 miles upstream from its confluence with Cottonwood Creek, 11 miles upstream from the point where the Tijuana River crosses the international boundary between the United States and Mexico, and 10 miles southeast of Tijuana, Baja California.

**RECORDS:** Computed from monthly reservoir records of storage, releases, spills, leakage, evaporation and rainfall. Records obtained by the Ministry of Hydraulic Resources through May 1961; from June 1961 through March 1966 by the Junta de Agua Potable y Alcantarillado del Distrito Urbano of Tijuana, Baja California, and from April 1966 by the State of Baja California Commission of Public Services for Tijuana. Records furnished by the Mexican Section of the Commission. Records available: May 1937 through 1971. Storage began in Rodriguez on September 22, 1936.

**REMARKS:** Records of runoff represent all water reaching Rodriguez Reservoir including rainfall on the reservoir water surface. Area-capacity-elevation rating for reservoir used in the computations is dated 1927 when the reservoir area was initially surveyed. Elevation of crest of spillway 380.08 feet above mean sea level; at top of spillway gates 410.10 feet above mean sea level. Reservoir capacity at spillway crest 76,210 acre-feet; at top of spillway gates 111,070 acre-feet.

**EXTREMES:** Maximum monthly inflow, 77,320 acre-feet, April 1941; minimum, no flow during part of most years.

### Monthly Discharge in Acre-Feet

Month	Current Year 1971	Period 1938-1971		
		Average	Maximum	Minimum
January	61.5	861	6,569	0
February	67.4	2,384	41,295	5.8
March	45.7	5,934	68,321	4.2
April	58.2	3,104	77,790	0
May	34.3	396	9,962	0
June	19.0	74.1	891	0
July	26.1	76.0	326	0
August	11.0	50.3	770	0
September	40.9	50.4	466	0
October	122	63.6	344	0
November	79.5	160	1,940	0
December	73.2	929	15,686	12.8
Yearly	639	14,082	177,668	254

## DIVERSIONS FROM RODRIGUEZ RESERVOIR, BAJA CALIFORNIA

**DESCRIPTION:** Sparling flow meter located immediately below the dam in the pipe line which carries water released from Rodriguez Reservoir to the North and South Canals.

**RECORDS:** Direct recording by Sparling flow meter. Records obtained by the Ministry of Hydraulic Resources through May 1961; from June 1961 through March 1966 by the Junta de Agua Potable y Alcantarillado del Distrito Urbano of Tijuana, Baja California, and from April 1966 by the State of Baja California Commission of Public Services for Tijuana. Records furnished by the Mexican Section of the Commission. Records available: May 1937 through 1971.

**REMARKS:** Since the dam was completed in 1937, water has been diverted directly into the aqueduct for domestic use for Tijuana, Baja California and into the North and South Canals for irrigation in Mexico. The North Canal delivers water to lands in the Tijuana Valley north of the Rio de las Palmas and the South Canal delivers water to lands in the valley south of the Rio de las Palmas and the Tijuana River. During 1971, no water was released for irrigation of farm lands.

**EXTREMES:** Maximum monthly diversion, 1,963 acre-feet, July 1944; minimum, no flow March and April 1941, August 1960, and December 1962.

### Monthly Discharge in Acre-Feet

Month	Current Year 1971	Period 1938-1971		
		Average	Maximum	Minimum
January	168	245	782	2.3
February	132	272	1,132	1.9
March	156	328	1,223	0
April	130	464	1,602	0
May	156	633	1,676	1.8
June	154	735	1,857	1.9
July	143	778	1,963	1.9
August	153	670	1,859	0
September	85.1	540	1,420	1.9
October	2.7	467	1,186	1.9
November	2.1	357	1,037	2.1
December	1.9	314	981	0
Yearly	1,284	5,801	15,317	59.6

## TIJUANA RIVER AT INTERNATIONAL BOUNDARY

**DESCRIPTION:** Water-stage recorder on right bank about 550 feet downstream from the international boundary and about 0.8 mile west of the international gate at San Ysidro, California. Zero of gage is at mean sea level, U.S.C. & G. S. datum.

**RECORDS:** Based on current meter and Parshall flume measurements and observations of no flow and a continuous record of gage heights. Records obtained and furnished by the United States Section of the Commission. Records available: May 1947 through 1971.

**EXTREMES:** Since May 1947: Maximum instantaneous discharge, 2,570 second-feet, March 15, 1952; minimum discharge, no flow during part or all of each year since 1951.

**Mean Daily Discharge in Second Feet 1971 — Annual and Period Summary**

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	0	0	0	0	0	0	0	0	0	0
2	1.4	0	0	0	0	0	0	0	0	0	0	0
3	.2	0	0	0	0	0	0	0	0	0	0	0
4	.1	0	0	0	0	0	0	0	0	0	0	1.5
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	15.4	0	0	0	0	0	0	0
8	0	0	0	0	3.7	0	0	0	0	0	0	0
9	0	0	0	0	.1	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	.7	0	.4	0	0	0	0	0	0	0	0	0
14	.1	0	0	1.1	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	.1	0	0	0	0	0	0	0	.5	0	0
17	0	5.7	0	0	0	0	0	0	0	0	0	0
18	0	.1	0	0	0	0	0	0	0	0	0	0
19	0	.3	0	0	0	0	0	0	0	0	0	0
20	0	.1	0	0	0	0	0	0	0	0	0	0
21	0	.1	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	3.7
23	0	2.1	0	0	0	0	0	0	0	0	0	.2
24	0	.3	0	0	0	0	0	0	0	0	0	2.2
25	0	.1	0	0	0	0	0	0	0	0	0	5.5
26	0	0	0	0	0	0	0	0	0	0	0	1.9
27	0	0	0	0	0	0	0	0	0	0	0	16.9
28	0	0	0	0	0	0	0	0	0	0	0	10.6
29	0	0	0	0	0	0	0	0	0	0	0	2.0
30	0	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0	0	0
Sum	2.5	8.9	0.4	1.1	19.2	0	0	0	0	0.5	0	44.5
Current Year 1971												
Month	Extreme Gage Feet		Extreme Second Feet			Average Second Feet	Total Acre Feet	Period 1947-1971				
	High	Low	Day	High	Low			Day	Average	Maximum	Minimum	
Jan.	46.43	45.95	2	8.2	† 1	0	0.1	5.0	416	4,603	0	
Feb.	46.85	45.95	17	26.4	† 1	0	.3	17.7	286	1,496	0	
Mar.	46.31	45.95	13	4.3	† 1	0	0	.8	870	13,309	0	
Apr.	46.55	45.95	14	12.4	† 1	0	0	2.2	250	2,926	0	
May	47.88	45.95	7	127	† 1	0	.6	38.1	42.4	312	0	
June	45.95	45.95		0		0	0	0	26.7	309	0	
July	45.95	45.95		0		0	0	0	21.1	239	0	
Aug.	45.95	45.95		0		0	0	0	18.3	193	0	
Sept.	45.95	45.95		0		0	0	0	23.8	216	0	
Oct.	46.40	45.95	16	7.2	† 1	0	0	1.0	35.3	305	0	
Nov.	45.95	45.95		0		0	0	0	106	1,084	0	
Dec.	47.64	45.95	27	93.5	† 1	0	1.4	88.3	291	2,725	0	
Yearly	47.88	45.95		127		0	0.2	153	2,387	19,882	0	

† And other days

## TIJUANA RIVER NEAR NESTOR, CALIFORNIA

DESCRIPTION: Water-stage recorder on county road bridge 4.1 miles downstream from the international land boundary between the United States and Mexico, 2.9 miles upstream from mouth of the river, and 1.7 miles south of Nestor, California. Zero of gage is 15.14 feet above mean sea level, U. S. C. & G. S. datum. From April 10, 1953 to August 5, 1958, station was located 2 miles upstream at different datum.

RECORDS: Based on current meter measurements or observation of no flow generally made twice a month. Records obtained and furnished by the U. S. Geological Survey. Records available: October 1914 through September 1915, and October 1922 through 1971 (October 1922 through May 1936 are from city of San Diego, California).

REMARKS: The flow at this station is partially controlled by Morena and Barrett Reservoirs on Cottonwood Creek in the United States and by Rodriguez Reservoir on Rio de las Palmas in Mexico. Some diversions for irrigation are normally made in Mexico whenever surface runoff occurs in the river or in its two principal tributaries.

EXTREMES: Since October 1, 1936: Maximum discharge, 17,700 second-feet, February 7, 1937 (gage height 8.20 feet), obtained from rating curve extended above 2,000 second-feet on basis of velocity-depth relationship, and cross section after peak of the flood. Minimum discharge, no flow during parts of most years.

Mean Daily Discharge in Second Feet 1971 — Annual and Period Summary

Mean Daily Discharge in Second Feet 1971												
Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0	0	0
Sum	0	0	0	0	0	0	0	0	0	0	0	0
Current Year 1971									Period 1937-1971			
Month	Extreme Gage Feet		Extreme Second Feet			Average Second Feet	Total Acre Feet	Acre Feet				
	High	Low	Day	High	Low			Average	Maximum	Minimum		
Jan.							0	737	4,070	0		
Feb.							0	4,054	66,920	0		
Mar.							0	7,085	107,000	0		
Apr.							0	5,058	181,900	0		
May							0	676	18,340	0		
June							0	114	3,060	0		
July							0	22.8	523	0		
Aug.							0	16.1	242	0		
Sept.							0	23.7	234	0		
Oct.							0	30.9	1,340	0		
Nov.							0	138	1,490	0		
Dec.							0	742	7,930	0		
Yearly							0	19,748	332,749	0		

## STORED WATER IN RESERVOIRS, TIJUANA RIVER BASIN

Data are presented below for all storage reservoirs in the Tijuana River Basin. The data represent contents on the last day of the month in acre-feet. The reservoir capacities indicated are total capacities, at the top of the spillway gates in closed position on the controlled spillways of Barrett and Rodriguez Dam, and at spillway level for Morena Dam, which has had an uncontrolled spillway since the spillway gates were removed in 1942. The records of storage reported below for Morena, Barrett, and Rodriguez Reservoirs are based on the capacities as determined by the following surveys: Morena 1948; Barrett 1948, 1951, and 1955; and Rodriguez 1927, when the reservoir area was initially surveyed.

Records for Morena and Barrett Reservoirs are obtained and furnished by the city of San Diego, the U. S. Geological Survey, and the National Weather Service. Records for Rodriguez Reservoir obtained and furnished by the State Department of Public Works and Services for Tijuana, Baja California.

### In Acre-Feet

Month	MORENA RESERVOIR, CALIFORNIA (Capacity 50,210)		BARRETT RESERVOIR, CALIFORNIA (Capacity 44,760)		RODRIGUEZ RESERVOIR, BAJA CALIFORNIA (Capacity 111,880)		TOTAL IN TIJUANA RIVER BASIN RESERVOIRS (Capacity 206,850)	
	1971	Average 1937-1971	1971	Average 1937-1971	1971	Average 1937-1971	1971	Average 1937-1971
Jan.	3,877	16,176	1,367	11,466	1,417	32,282	6,661	59,924
Feb.	3,898	16,863	1,491	12,927	1,300	33,241	6,689	63,031
Mar.	3,893	18,116	1,584	14,481	1,121	36,712	6,598	69,309
Apr.	3,838	18,113	1,638	14,938	985	36,691	6,461	69,792
May	3,790	17,957	1,668	14,264	800	36,006	6,258	68,227
June	3,670	17,464	1,632	13,480	602	34,909	5,904	65,853
July	3,502	16,998	1,584	12,663	427	33,746	5,513	63,407
Aug.	3,460	16,569	1,544	11,894	233	32,694	5,237	61,157
Sept.	3,341	16,036	1,505	11,607	146	31,801	4,992	59,444
Oct.	3,261	15,802	1,487	11,252	224	31,054	4,932	58,108
Nov.	3,206	15,690	1,484	10,890	263	30,540	4,953	57,120
Dec.	3,321	15,748	1,562	11,191	298	30,871	5,181	57,810
Avg.	3,588	16,794	1,545	12,592	651	33,379	5,786	62,765
Max.	3,898	# 61,670	1,668	ø 45,920	1,417	109,608	6,689	213,600
Min.	3,206	10	1,367	106	146	0	4,953	1,264

# March 31, 1941 - Prior to removal of spillway gates

ø April 30, 1937 - Sand bags were placed on crest of spillway

## RAINFALL ON THE TIJUANA RIVER WATERSHED IN INCHES

Tabulated below are monthly records of rainfall with averages for their periods of record at stations located in California and Baja California. Daily records, where available, are on file in the offices of the United States and Mexican Sections of the Commission. For location, elevation, period of record, and the observer, see alphabetical listing of these stations on page 80.

### In United States

Month	Morena Dam, California		Barrett Dam, California		Marron Valley, California		Potrero, California		Sawday Ranch, California	
	1971	Average 1906-1971	1971	Average 1907-1971	1971	Average 1951-1971	1971	Average 1914-1971	1971	Average 1950-1971
Jan.	1.24	3.79	1.18	3.34	0.95	2.55	1.46	3.39	1.67	3.03
Feb.	1.50	3.79	1.75	3.39	2.00	1.92	1.63	3.70	1.42	2.30
Mar.	.18	3.35	.50	2.88	.54	2.23	.71	2.91	.62	2.66
Apr.	1.22	1.80	1.35	1.61	1.43	1.44	2.29	1.86	1.56	1.84
May	.70	.63	.93	.58	.69	.43	1.05	.65	.46	.45
June	0	.14	0	.06	0	.04	0	.08	0	.04
July	0	.37	.01	.10	0	.03	.04	.20	.30	.47
Aug.	2.15	.55	.07	.20	0	.12	.04	.19	.92	.75
Sept.	.28	.34	.14	.25	.10	.19	.21	.25	.27	.36
Oct.	1.22	.86	1.24	.69	.97	.30	1.50	.72	1.23	.39
Nov.	.20	1.55	.41	1.33	.11	1.53	.23	1.45	T	1.74
Dec.	4.43	3.33	3.96	2.94	4.09	2.37	4.62	3.24	4.67	2.53
Yearly	13.12	20.50	11.54	17.37	10.88	13.15	13.78	18.64	13.12	16.56

Month	Campo, California		Chula Vista, California							
	1971	Average 1900-1971	1971	Average 1930-1971						
Jan.	1.12	3.00	0.31	1.79						
Feb.	1.22	3.32	.72	1.72						
Mar.	.40	2.73	.13	1.46						
Apr.	1.46	1.50	.54	.87						
May	.67	.54	.63	.24						
June	0	.07	.06	.05						
July	.07	.53	T	.02						
Aug.	1.00	.52	T	.07						
Sept.	.25	.33	.13	.16						
Oct.	1.18	.62	.33	.39						
Nov.	.05	1.35	.86	1.06						
Dec.	3.60	2.61	2.16	1.76						
Yearly	11.02	17.12	5.87	9.59						

### In Mexico

Month	La Rumorosa, Baja California		Tecate, Baja California		Tijuana, Baja California		Rodríguez Dam, Baja California		Valle de Las Palmas, Baja Calif.	
	1971	Average 1945-1971	1971	Average 1946-59 1961-71	1971	Average 1948-59 1961-71	1971	Average 1938-1971	1971	Average 1948-1971
Jan.	0.39	0.67	0.94	2.32	0.35	1.77	0.51	1.42	0.08	1.42
Feb.	.79	.35	1.34	1.34	.94	1.26	.59	1.26	.55	.98
Mar.	0	.51	.39	1.85	.24	1.14	.16	1.34	.16	1.06
Apr.	.39	.35	1.42	1.22	.51	.67	.79	.79	.87	.63
May	.39	.08	.31	.31	.51	.24	.39	.12	.12	.12
June	0	.04	0	.08	T	.04	T	T	0	T
July	0	.28	0	.08	0	.04	T	T	T	.04
Aug.	1.06	.63	0	.16	0	.04	T	.04	.91	.12
Sept.	.31	.28	0	.12	T	.12	.04	.24	.16	.16
Oct.	.16	.31	.31	.28	.31	.28	.47	.28	.47	.26
Nov.	0	.47	0	1.22	T	1.02	.08	.87	.08	.75
Dec.	.55	.71	3.35	2.17	2.01	1.38	1.57	1.65	1.54	1.02
Yearly	4.06	4.69	8.07	11.85	4.88	8.50	4.61	7.91	4.92	6.65

T Trace

## RAINFALL ON THE TIJUANA RIVER WATERSHED IN INCHES

### In Mexico

Month	El Pinal, Baja California		San Juan de Dios, Baja California							
	1971	Average 1964-1971	1971	Average 1956-1971						
Jan.	0.47	2.24	0.79	2.01						
Feb.	2.05	2.44	1.42	1.97						
Mar.	.35	1.97	.43	1.65						
Apr.	2.13	2.17	1.30	1.26						
May	1.18	.28	.55	.31						
June	0	0	0	.20						
July	.12	.75	1.38	1.06						
Aug.	.67	.79	2.13	.75						
Sept.	.63	.55	.16	.43						
Oct.	0 1.81	.31	.75	.51						
Nov.	.39	1.81	0 .47	1.26						
Dec.	4.45	4.21	2.56	2.09						
Yearly	14.25	17.17	11.93	15.20						

0 Partially registering

## LOCATION OF RAINFALL STATIONS ON THE TIJUANA RIVER WATERSHED

### In United States

NAME OF STATION	LATI- TUDE	LONGI- TUDE	8 ELEV. (FT.)	RECORD BEGAN	OBSERVER
Berrett Dam, California	32° 41'	116° 40'	1,750	1907	City of San Diego
Campo, California	32° 37'	116° 28'	2,630	1877	Archie C. Leach
China Vista, California	32° 36'	117° 06'	9	1930	Western Salt Company
Marron Valley, California	32° 34'	116° 46'	550	1951	Fred Mellor
Morena Dam, California	32° 41'	116° 32'	3,010	1906	City of San Diego
Potrero, California	32° 37'	116° 37'	2,390	1914	L. W. Whitehouse
Sawday Ranch, California	32° 45'	116° 29'	3,200	1950	William Tulloch

### In Mexico

NAME OF STATION	LATI- TUDE	LONGI- TUDE	8 ELEV. (FT.)	RECORD BEGAN	OBSERVER
El Pinal, Baja California	32° 12'	116° 17'	4,429	1964	Hydraulic Resources
La Rumorosa, Baja California	32° 33'	116° 03'	3,937	1946	Hydraulic Resources
Rodriguez Dam, Baja California	32° 26'	116° 55'	459	1938	Hydraulic Resources
San Juan de Dios, Baja California	32° 08'	116° 10'	3,280	1956	Hydraulic Resources
Tecate, Baja California	32° 32'	116° 39'	1,690	1946	Hydraulic Resources
Tijuana, Baja California	32° 31'	117° 02'	180	1948	Hydraulic Resources
Valle de las Palmas, Baja California	32° 23'	116° 40'	148	1948	Hydraulic Resources

8 Elevation above mean sea level

" Estimated from topographic maps



## EVAPORATION IN THE TIJUANA RIVER BASIN IN INCHES

Tabulated below are records of evaporation observed at three stations in California and at five stations in Baja California, with averages for their periods of record. The stations in California are observed by Western Salt Company, city of San Diego, California, and the United States Section of the Commission; those in Baja California are observed by the Ministry of Hydraulic Resources. For specific location of these stations, refer to data opposite same station name shown in "Location of Rainfall Stations", page 80 in this bulletin.

1. Barrett Reservoir: January 1921 through September 1926, square 3-foot by 3-foot by 18-inch deep floating pan. October 1926 through 1971, square 3-foot by 3-foot by 18-inch deep land pan set 15 inches in ground.
2. Chula Vista: September 1918 through 1971, National Weather Service 4-foot diameter pan, 10 inches deep, set on 2- by 4-inch-timber grill.
3. Marron Valley: Records available February 1951 to December 1970, at which time the station was discontinued.
4. Morena Reservoir: October 1915 through December 1921, square 3-foot by 3-foot by 18-inch deep floating pan. January 1922 through August 1926 records are the average of evaporation in a square 3-foot by 3-foot by 18-inch deep floating pan and a land pan of the same dimensions. September 1926 through 1971, square 3-foot by 3-foot by 18-inch deep land pan set 15 inches in ground.

### In United States

Month	Morena Dam, California		Barrett Dam, California		Chula Vista, California	
	1971	Average 1916-1971	1971	Average 1921-1971	1971	Average 1919-1971
Jan.	1.55	2.25	1.58	1.87	2.83	2.83
Feb.	1.94	2.30	2.12	2.22	3.45	3.34
Mar.	3.34	3.60	3.69	3.59	5.19	5.01
Apr.	3.53	4.87	4.21	4.84	6.44	5.93
May	4.52	6.85	4.98	6.94	6.13	6.86
June	7.64	8.75	7.18	8.47	6.64	6.97
July	8.93	10.20	8.48	10.14	7.11	7.61
Aug.	7.17	9.51	8.42	9.58	7.59	7.33
Sept.	6.41	7.71	6.52	7.81	6.77	6.11
Oct.	7.89	5.48	4.42	5.51	5.77	4.92
Nov.	1.98	3.54	2.29	3.46	3.27	3.63
Dec.	2.96	2.53	1.06	2.10	2.45	2.74
Yearly	57.86	67.59	54.95	66.53	63.69	63.28

### In Mexico

Month	Tecate, Baja California		Tijuana, Baja California		Rodriguez Dam, Baja California		Valle de las Palmas, Baja California		San Juan de Dios, Baja California	
	1971	Average 1961-71	1971	Av. 1952-59 1961-1971	1971	Av. 1939-42 1946-1971	1971	Average 1948-71	1971	Average 1956-71
Jan.	2.48	3.31	2.95	2.87	3.15	3.62	2.64	3.70	3.35	2.72
Feb.	3.11	3.35	3.46	3.39	3.35	3.82	3.94	3.66	Q	2.60
Mar.	6.77	4.45	4.88	4.06	5.39	5.00	6.81	5.31	6.02	4.13
Apr.	4.72	5.24	5.04	4.72	5.63	5.79	6.73	6.46	5.91	4.72
May	3.15	6.06	5.08	5.75	5.91	7.32	7.20	7.44	6.97	6.46
June	8.58	6.38	5.75	5.71	7.56	7.91	9.57	9.21	9.41	6.89
July	6.50	8.46	6.22	6.69	7.80	8.98	10.16	10.71	9.72	8.58
Aug.	*	8.11	7.20	7.01	8.43	8.31	9.84	10.16	7.80	7.40
Sept.	6.85	6.89	5.55	5.98	6.81	7.09	8.35	8.78	8.23	7.91
Oct.	5.63	6.42	5.04	4.76	5.75	5.98	6.30	6.42	4.76	5.20
Nov.	3.82	3.94	2.80	3.31	3.11	4.96	3.86	4.53	Q	3.62
Dec.	*	3.70	2.52	2.91	2.20	4.06	2.01	3.90	Q	3.11
Yearly	*	67.76	57.20	55.63	65.08	73.11	77.40	79.72	*	60.71

\* Record incomplete

Q Tank frozen

## TEMPERATURE IN THE TIJUANA RIVER BASIN IN DEGREES FAHRENHEIT

The maximum, minimum, and monthly average temperature observations for United States stations are from daily readings of thermometers generally exposed in a shelter located a few feet above sod-covered ground. The maximum and minimum temperatures shown for the stations in Mexico are from daily maximum and minimum thermometer observations, with maximum and minimum for their periods of record. For specific location, elevation, period of record, and the observer, refer to data opposite same station name as shown in "Location of Rainfall Stations", page 80 in this bulletin.

### In United States

Month	Barrett Dam, California				Chula Vista, California				Campo, California			
	1971			Average 1931- 1971	1971			Average 1931- 1971	1971			Average 1951- 1971
	Mean	Max.	Min.		Mean	Max.	Min.		Mean	Max.	Min.	
Jan.	50.0	90	25	48.6	52.6	76	29	52.5	47.8	84	23	46.8
Feb.	50.6	85	31	50.4	53.6	77	37	53.8	47.3	85	22	47.9
Mar.	54.1	89	28	53.2	53.9	69	32	55.2	50.8	84	23	49.3
Apr.	55.2	87	36	57.3	56.8	81	42	57.9	50.9	84	26	
May	58.8	86	42	62.7	58.3	78	47	60.6	54.9	85	29	58.0
June	67.7	101	41	67.9	61.0	72	49	62.8	63.7	99	31	64.4
July	76.4	105	49	76.1	66.4	79	57		73.3	100	37	73.4
Aug.	79.4	103	48	76.4	72.2	82	60		75.6	100	39	73.7
Sept.	72.8	110	39	72.3	68.8				69.1	105	29	69.1
Oct.	60.2	97	28	64.1	61.7	89	36	62.8	56.5	94	22	60.8
Nov.	52.8	86	30	55.9	55.5	75	41		50.3	87	21	52.7
Dec.	44.4	65	25	50.4	50.9	65	33	54.2	43.1	66	19	
Yearly	60.2	110	25	61.3	59.3		29		56.9	105	19	

### In Mexico

Month	La Rumorosa, Baja California				Tecate, Baja California				Tijuana, Baja California			
	1971		1946-1971		1971		1946-59 & 61-71		1971		1948-59 & 61-71	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Jan.	75	14	81	5	90	27	100	21	93	37	93	27
Feb.	72	27	82	10	84	32	100	21	86	41	102	32
Mar.	75	25	88	16	90	32	93	25	86	43	90	34
Apr.	79	30	91	23	90	34	99	32	90	45	97	34
May	79	36	97	28	82	34	100	36	97	54	97	43
June	95	39	113	34	100	32	104	32	93	50	99	41
July	99	55	104	39	*	*	115	36	97	57	120	46
Aug.	93	59	102	46	*	*	113	34	100	59	106	52
Sept.	97	43	104	34	*	*	115	36	100	54	120	46
Oct.	86	28	93	25	97	27	106	27	108	41	117	41
Nov.	75	30	88	14	84	27	97	27	97	43	108	34
Dec.	61	25	81	10	75	30	97	23	75	34	99	25
Yearly	99	14	113	5	*	*	115	21	108	34	120	25

Month	Rodriguez Dam, Baja California				Valle de las Palmas, Baja California				El Pinal, Baja California			
	1971		1938-1971		1971		1948-1971		1971		1964-1971	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Jan.	86	34	88	27	91	21	91	12	73	21	73	12
Feb.	90	37	91	32	90	27	99	23	75	27	75	21
Mar.	84	39	88	32	93	34	100	28	75	28	77	23
Apr.	93	41	93	36	93	37	104	32	79	27	82	18
May	90	48	99	37	90	37	108	36	77	27	90	27
June	91	46	108	46	104	45	118	39	95	28	99	28
July	93	54	104	48	108	48	120	45	97	36	102	36
Aug.	104	54	104	52	104	50	111	43	97	54	104	39
Sept.	109	43	109	48	117	46	117	43	100	25	102	25
Oct.	102	34	108	34	102	32	108	38	*	*	95	30
Nov.	88	39	99	30	90	30	100	19	77	25	84	25
Dec.	70	28	93	27	70	27	91	21	57	21	79	21
Yearly	109	28	109	27	117	21	120	12	100	21	104	12

\* Record incomplete

TEMPERATURE IN THE TIJUANA RIVER BASIN  
IN DEGREES FAHRENHEIT

In Mexico

Month	San Juan de Dios, Baja California											
	1971		1956-1971									
	Max.	Min.	Max.	Min.								
Jan.	79	21	88	7								
Feb.	77	21	84	16								
Mar.	79	19	84	18								
Apr.	77	23	102	19								
May	77	19	91	19								
June	95	39	106	28								
July	97	36	120	36								
Aug.	102	39	106	32								
Sept.	99	25	100	25								
Oct.	90	18	100	18								
Nov.	79	18	99	12								
Dec.	68	14	88	14								
Yearly	102	14	120	7								

## DRAINAGE AREAS ABOVE GAGING STATIONS AND IRRIGATED AREAS ALONG TIJUANA RIVER AND TRIBUTARIES

1971

The total area within Tijuana River basin is 1,731 square miles, as determined from the best available maps from both the United States and Mexico. The drainage areas shown below are tabulated according to their downstream sequence.

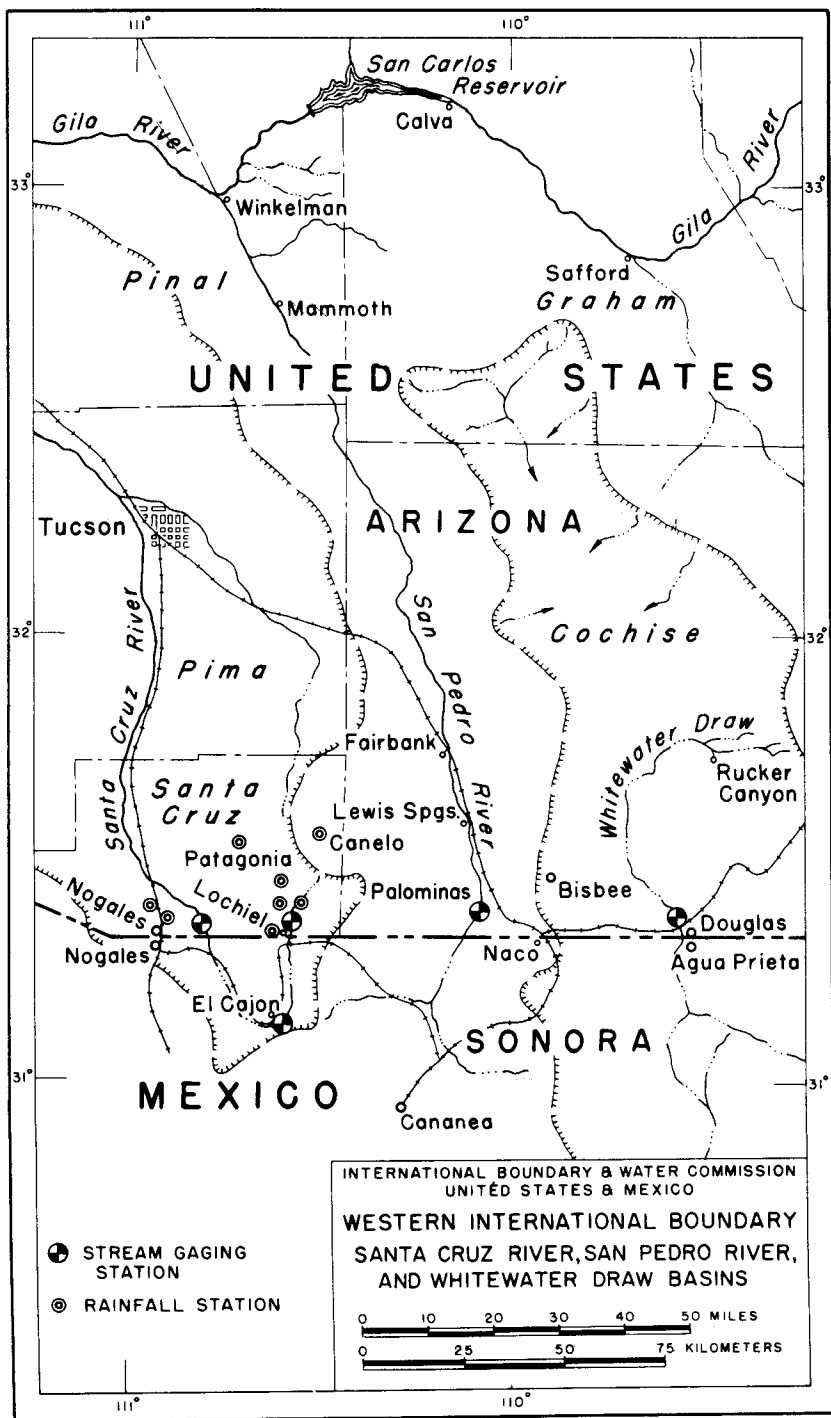
The irrigated areas, tabulated in downstream sequence, are from the most reliable sources available. Those in the United States were furnished by the United States Department of Agriculture and the State Engineer, State of California, or estimated from aerial photographs. Those in Mexico were furnished by the Ministry of Hydraulic Resources of Mexico through the Mexican Section of the Commission. All irrigation in the Tijuana Basin in 1971 was by pumping from ground water.

Designation of Areas	Drainage Basin-Square Miles			Irrigated Areas-Acres		
	United States	Mexico	Total	United States	Mexico	Total
Cottonwood Creek						
above Morena Dam	114	0	114	(a) 75	0	(a) 75
Morena Dam to Barrett Dam	133	0	133	0	0	0
above Barrett Dam	247	0	247	(a) 75	0	(a) 75
below Barrett Dam and above Tecate Creek	65	0	65	(a) 145	0	(a) 145
above Tecate Creek	312	0	312	(a) 220	0	(a) 220
Campo Creek						
above International Boundary	82	4	86	(a) 320	0	(a) 320
Tecate Creek						
above International Boundary (not including Campo Creek)	19	64	83	0	0	0
Cottonwood Creek						
above International Boundary Station	413	68	481	(a) 540	0	(a) 540
Rio de las Palmas						
above Rodriguez Dam	7	981	988	0	(b) 0	0
Tijuana River						
above Nestor Gaging Station	458	1,266	1,724			
above the Mouth	462	1,269	1,731	3,000	(c) 0	3,000

(a) Estimated. During extremely dry years these areas may be materially reduced.

(b) Areas in upper valleys may be irrigated by pumping from ground water.

(c) There was no irrigation in 1971 in the Tijuana Irrigation District, Tijuana Valley, Baja California, Mexico, from the Rodriguez Reservoir.



## WHITEWATER DRAW NEAR DOUGLAS, ARIZONA

**DESCRIPTION:** Water-stage recorder located on U. S. Highway 80 bridge between Douglas and Bisbee, Arizona, about 450 feet upstream from the Southern Pacific Railroad bridge, 1.5 miles upstream from the international boundary, and 2 miles west of Douglas, Arizona. Zero of gage is 3,906.94 feet above mean sea level, U. S. C. & G. S. datum of 1929.

**RECORDS:** Based on current meter measurements or observations of no flow during the year. Computations by shifting control methods. Records obtained and furnished by the U. S. Geological Survey. Records fair. Records available: August to October 1911 (gage heights and discharge measurements only), July to October 1912, January to June 1913, October 1913, December 1913 to June 1914, February to June 1915, October 1915 to September 1919, October 1919 to April 1922 (gage heights and discharge measurements only), June 1930 to December 1933, May 1935 to July 1947, October 1947 through 1971 (July 1954 to March 1955 monthly discharge only).

**REMARKS:** Diversions above this station are mainly by pumping from ground water for irrigation. Records show flow at the international boundary into Mexico except for some smelter waste water entering the stream a short distance below this station.

**EXTREMES:** Prior to 1936: Maximum recorded discharge, 3,450 second-feet August 10, 1931 (gage height 12.15 feet); maximum estimated discharge, 4,050 second-feet July 27, 1919; minimum discharge, no flow for several days of many years. Since 1936: Maximum discharge, 5,060 second-feet August 7, 1955; maximum gage height 16.55 feet July 29, 1966; minimum daily discharge, no flow at times during most years.

### Mean Daily Discharge in Second Feet 1971 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	0	0	0	0	0	102	0.10	0.05	0	0
2	0	0	0	0	0	0	0	20	4.5	0	0	0
3	0	0	0	0	0	0	0	111	0	0	0	0
4	0	0	0	0	0	0	0	99	3.8	.05	0	0
5	0	0	0	0	0	0	0	7.1	1.0	.05	0	0
6	0	0	0	0	0	0	0	6.0	.70	0	0	0
7	0	0	0	0	0	0	0	5.4	.66	69	0	0
8	0	0	0	0	0	0	0	5.1	.63	26	0	0
9	0	0	0	0	0	0	0	4.6	.59	3.4	0	0
10	0	0	0	0	0	0	0	9.1	.60	.31	0	0
11	0	0	0	0	0	0	0	832	.60	28	0	0
12	0	0	0	0	0	0	0	440	.60	2.3	0	0
13	0	0	0	0	0	0	0	427	.58	.40	0	0
14	0	0	0	0	0	0	0	717	.55	.31	0	0
15	0	0	0	0	0	0	0	375	.55	.25	0	0
16	0	0	0	0	0	0	0	84	.55	.25	0	0
17	0	0	0	0	0	0	0	37	9.6	.25	0	0
18	0	0	0	0	0	0	0	94	25	.15	0	0
19	0	0	0	0	0	0	2.6	193	55	0	0	0
20	0	0	0	0	0	0	1.4	128	5.4	0	0	0
21	0	0	0	0	0	0	157	58	1.0	0	0	0
22	0	0	0	0	0	0	63	30	.50	0	0	0
23	0	0	0	0	0	0	11	14	.20	0	0	0
24	0	0	0	0	0	0	40	18	.15	0	0	0
25	0	0	0	0	0	0	27	20	.10	.31	0	0
26	0	0	0	0	0	0	13	3.0	.05	.10	0	0
27	0	0	0	0	0	0	13	1.0	0	0	0	0
28	0	0	0	0	0	0	10	.40	0	0	0	0
29	0	0	0	0	0	0	75	.20	0	0	0	0
30	0	0	0	0	0	0	130	.12	0	0	0	0
31	0	0	0	0	0	0	579	.10	0	0	0	0
Sum	0	0	0	0	0	0	1,122.0	3,743.12	224.01	131.18	0	0

Month	Current Year 1971						Period 1936-1971			
	Extreme Gage Feet		Extreme Second Feet		Average Second Feet	Total Acre Feet	Acre Feet			
	High	Low	Day	High	Low		Average	Maximum	Minimum	
Jan.				0	0	0	44.6	451	0	
Feb.				0	0	0	23.8	132	0	
Mar.				0	0	0	26.5	130	0	
Apr.				0	0	0	23.8	173	0	
May				0	0	0	17.3	138	0	
June				0	0	0	150	1,590	0	
July			31	579	† 1	36.2	2,225	8,110	39	
Aug.			11	832	31	.10	7,424	14,480	.3	
Sept.			3	111	127	0	444	3,170	.8	
Oct.			7	69	† 2	0	260	2,210	.4	
Nov.				0	0	0	43.5	352	0	
Dec.				0	0	0	143	2,363	0	
Yearly				832	0	14.	10,353	7,115.5	22,321	900

‡ Mean daily      † And other days      # 1947 records not available

## SEWAGE INFLUENT, DOUGLAS, ARIZONA INTERNATIONAL TREATMENT PLANT

**DESCRIPTION:** Parshall flume in influent line to the international treatment plant, equipped with Simplex digital meter for measuring combined sewage flows from Douglas, Arizona and Agua Prieta, Sonora; and Parshall flume with recorder for measuring the sewage from Douglas. Flows from Agua Prieta are deduced from total flows and the city of Douglas flows; however, since April 8, 1968, all sewage flows from Agua Prieta have been diverted to new oxidation ponds located in Mexico, 1.6 miles south of the international boundary.

**RECORDS:** Continuous monthly records since March 1948; daily records from March 18, 1948 through 1950 and from January 1952 through 1971.

**REMARKS:** The Douglas-Agua Prieta International Treatment Plant was constructed by the governments of the United States and Mexico in 1947 to correct a serious international sanitation problem. The plant is located in the United States adjacent to the international boundary about one mile west of the Douglas-Agua Prieta Port of Entry. Prior to December 1970, the treatment of sewage was complemented by the use of old oxidation ponds in Mexico adjacent to the international boundary. Since December 1970, sewage effluent from the plant flows into Mexico and then across to the right bank of the Agua Prieta Arroyo, by means of a canal bridge, to be used for irrigation.

Month	Total Monthly Flows			Mean Daily Flows-Millions of Gallons Per Day					
	Millions of Gallons			Current Year 1971			Period 1952-1971		
	U.S.	Mexico	Total	Maximum	Minimum	Mean	Maximum	Minimum	Mean
Jan.	32.720	0	32.720	1.280	0.930	1.056	1.618	0.619	1.058
Feb.	29.265	0	29.265	1.110	1.000	1.045	1.784	.584	1.060
Mar.	32.510	0	32.510	1.115	.940	1.049	1.598	.590	1.062
Apr.	31.230	0	31.230	1.180	.820	1.041	1.536	.619	1.059
May	33.350	0	33.350	1.180	1.010	1.076	1.595	.619	1.066
June	33.720	0	33.720	1.220	1.020	1.124	1.784	.626	1.126
July	36.480	0	36.480	1.240	1.050	1.177	3.209	.619	1.182
Aug.	37.700	0	37.700	1.350	1.040	1.216	1.985	.619	1.200
Sept.	36.290	0	36.290	1.340	1.090	1.210	1.884	.626	1.183
Oct.	35.210	0	35.210	1.200	1.040	1.136	1.667	.626	1.119
Nov.	32.880	0	32.880	1.180	1.000	1.096	1.586	.619	1.080
Dec.	33.470	0	33.470	1.170	.910	1.030	1.736	.619	1.034
<b>Yearly</b>	404.825	0	404,825	1.350	0.820	1.109	3.209	0.584	1.107

# SEWAGE INFLUENT, AGUA PRIETA, SONORA

## INTERNATIONAL OXIDATION PONDS

**DESCRIPTION:** Parshall flume equipped with staff gage in influent line to oxidation ponds. Since April 8, 1968, all sewage from Agua Prieta, Sonora has been diverted to oxidation ponds, which are located in Mexico; if necessary, sewage from Douglas, Arizona may be included, but this has never been done.

**RECORDS:** Discharges are computed from daily 11:00 a.m. readings of the staff gage by applying an index for that hour, determined from 7 days of hourly measurements from which the relationship between mean daily readings and 11:00 a.m. readings was developed. Records available: Mean daily flows from April 8, 1968 through 1971.

**REMARKS:** The construction of the international oxidation ponds in Agua Prieta, Sonora was completed in April 1968 by the government of Mexico, fulfilling an international agreement to solve the problem of insufficient capacity at the international treatment plant in Douglas, where the combined flows from Douglas and Agua Prieta were treated. If necessary, sewage from Agua Prieta may be treated in this plant, but since the completion of the oxidation ponds, this has never been done. The ponds are located 1.6 miles south of international monument 85A.

Month	Total Monthly Flows			Mean Daily Flows-Millions of Gallons Per Day					
	Millions of Gallons			Current Year 1971			Period 1968-1971		
	U.S.	Mexico	Total	Maximum	Minimum	Mean	Maximum	Minimum	Mean
Jan.	0	15.474	15.474	0.526	0.474	0.499	0.640	0.474	0.535
Feb.	0	15.053	15.053	.726	.526	.538	.726	.474	.560
Mar.	0	12.820	12.820	.418	.399	.413	.666	.399	.520
Apr.	0	13.587	13.587	.491	.418	.453	.666	.418	.527
May	0	15.080	15.080	.491	.472	.486	.666	.472	.536
June	0	14.662	14.662	.491	.472	.489	.617	.414	.495
July	0	15.313	15.313	.548	.491	.494	.617	.259	.503
Aug.	0	8.597	8.597	.609	0	.277	.967	0	.399
Sept. *	0	0	0	0	0	0	.617	0	.415
Oct.	0	8.340	8.340	.491	0	.269	.595	0	.470
Nov.	0	14.717	14.717	.491	.491	.491	.717	.414	.543
Dec.	0	14.971	14.971	.491	.472	.483	.709	.472	.546
<b>Yearly</b>	0	148.614	148.614	0.726	0	0.408	0.967	0	0.504

\* No sewage flow from the plant as the effluent line was out of order



## SAN PEDRO RIVER AT PALOMINAS, ARIZONA

**DESCRIPTION:** Water-stage recorder located near left bank on the downstream side of pier on bridge on Highway 92, 0.7 mile east of Palominas, 2.5 miles upstream from Green Brush Draw, 4.5 miles downstream from international boundary, and 12 miles southwest of Bisbee, Arizona. Zero of gage is 4,187.62 feet above mean sea level (State Highway bench mark).

**RECORDS:** Based on current meter measurements or observations of no flow during the year. Records available: May 1930 to October 1933, May 1935 to July 1941, and July 1950 through 1971. Records obtained and furnished by U. S. Geological Survey.

**REMARKS:** There are some small diversions for irrigation of a few hundred acres above this station, mostly in Mexico. Record shows approximate flow of river at international boundary.

**EXTREMES:** Maximum daily discharge, 22,000 second-feet on August 14, 1940 (gage height, 16.16 feet present datum), from rating curve extended above 5,600 second-feet on basis of slope-area measurement of peak flow; no flow at times in most summers. Greatest flood known occurred on September 28, 1926 (gage height, about 23.9 feet present datum, from floodmarks; discharge not determined).

## Mean Daily Discharge in Second Feet 1971 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.3	2.3	4.4	0.20	0.10	0	0	67.0	36.0	8.2	7.3	6.0
2	3.3	2.3	3.5	.10	.10	.10	0	32.0	393	7.3	7.7	6.0
3	2.8	2.3	3.8	.10	.10	0	0	32.0	56.0	7.7	7.7	6.0
4	1.7	1.6	4.4	.10	0	0	0	57.0	47.0	6.9	7.7	6.0
5	1.4	1.9	4.4	.10	0	0	6.3	45.0	44.0	5.1	8.2	6.0
6	1.5	1.9	3.5	.10	0	0	0	14.0	42.0	4.1	8.2	6.0
7	1.5	1.9	3.3	.10	0	0	0	8.6	40.0	10.0	8.2	6.0
8	1.5	1.7	3.0	.10	0	0	0	5.8	67.0	7.3	8.6	6.0
9	1.5	1.9	2.8	.20	0	0	0	32.0	54.0	6.5	8.2	6.0
10	1.5	1.2	2.3	.50	.10	1.0	0	519	46.0	6.5	7.3	6.0
11	1.7	1.2	2.3	.30	.10	1.0	0	2,140	44.0	6.5	6.9	6.0
12	1.7	1.0	2.1	.10	.20	1.0	0	391	38.0	6.5	6.9	6.0
13	1.7	1.1	1.9	.10	.50	0	0	1,680	35.0	6.5	6.5	6.0
14	1.4	1.2	1.4	0	.10	0	0	346	33.0	5.8	6.5	6.0
15	1.1	.70	2.1	0	.20	0	0	1,090	30.0	5.8	7.3	6.0
16	1.1	.6	2.3	.10	0	0	82.0	236	26.0	5.8	9.1	6.0
17	1.6	.7	2.1	0	.20	0	49.0	113	28.0	5.8	6.9	6.0
18	1.6	1.9	2.1	0	.10	0	27.0	199	151	5.8	6.1	6.0
19	1.2	2.5	2.1	0	.10	0	4.9	892	334	5.8	6.8	6.0
20	1.4	2.8	.80	0	.10	0	.70	1,980	30.0	5.8	5.4	6.0
21	.8	2.8	.30	0	.10	0	289	1,010	20.0	5.8	6.1	6.0
22	1.0	3.3	.30	0	0	0	206	400	10.0	5.8	6.1	6.0
23	1.4	3.0	.20	0	0	0	22.0	250	10.0	5.8	6.0	6.0
24	1.1	3.8	.20	0	.10	7.3	1,300	395	9.6	14.0	6.0	6.0
25	1.1	4.1	.70	0	.30	0	240	102	12.0	119	6.0	6.9
26	1.1	4.1	.60	0	.20	0	20.0	40.0	8.6	15.0	6.0	6.9
27	1.1	4.1	.60	0	.30	0	16.0	40.0	8.6	11.0	6.0	6.5
28	1.0	4.1	.50	.10	.60	0	48.0	40.0	5.0	8.2	6.0	6.1
29	1.0		.20	0	.70	0	662	185	9.6	6.9	6.0	6.5
30	1.2		.20	0	.70	0	502	62.0	12.0	6.9	6.0	
31	1.9		.20		0		584	74.0		7.3		7.3
Sum	47.20	62.00	58.60	2.30	5.00	10.40	4,058.90	12,477.4	1,679.4	335.4	206.7	190.7
<b>Current Year 1971</b>												
Month	Extreme Gage Feet		Extreme Second Feet				Average Second Feet	Total Acre Feet	Period 1951-1971			Acre Feet
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum	
Jan.			† 1	3.3	21	0.80	1.52	93.6	677	7,813		2.6
Feb.			† 25	4.1	16	.60	2.21	123	368	1,577		3.0
Mar.			† 1	4.4	† 23	.20	1.89	116	300	2,043		36.0
Apr.			10	.50	† 14	0	.08	4.6	83.2	330		0
May			† 29	.70	† 4	0	.16	9.9	18.4	68.8		0
June			24	7.3	† 1	0	.35	20.6		1,391		0
July			24	1,300	† 1	0	131	8,051	6,428	17,238		184
Aug.			11	2,140	8	5.8	402	24,749	11,236	36,369		165
Sept.			2	393	28	5.0	56.0	3,331	1,780	16,344		28.4
Oct.			25	119	6	4.1	10.8	665	173	1,201		0
Nov.			16	9.1	20	5.4	6.89	410		609		0
Dec.			31	7.3	† 1	6.0	6.15	378	889	10,959		6.2
Yearly				2,140		0	51.6	37,952	22,270	55,364		4,400

Ø Mean daily

† And other days

# SANTA CRUZ RIVER NEAR LOCHIEL, ARIZONA

**DESCRIPTION:** Water-stage recorder located in the United States near left bank on the downstream side of concrete bridge pier of county highway bridge, 2.5 miles northeast of Lochiel, Arizona, and 1.5 miles upstream from the international land boundary. The elevation of the zero of the gage has not been determined but topographic maps indicate the elevation of the stream bed at the gage is about 4,620 feet.

**RECORDS:** Based on current meter measurements or observations of no flow during the year. Records obtained and furnished by the U. S. Geological Survey. Records available: January 1949 through 1971.

**REMARKS:** There are small diversions by ground water pumping for irrigating about 200 acres above this station.

**EXTREMES:** Maximum discharge, 4,810 second-feet on September 12, 1965 (gage height 8.90 feet); minimum discharge, no flow for several days of each year.

## Mean Daily Discharge in Second Feet 1971 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.79	0.32	0.47	0.31	0.07	0.05	0	1.0	2.1	3.6	3.2	1.4
2	.78	.30	.44	.25	.05	.04	0	.22	2.1	3.2	3.1	1.4
3	.79	.26	.46	.19	.05	.03	.04	.43	2.1	3.3	2.9	1.6
4	.69	.26	.50	.17	.06	.03	.04	.26	2.1	3.4	2.8	1.5
5	.68	.30	.48	.19	.06	.02	.03	.24	2.1	3.4	2.7	1.5
6	.68	.32	.43	.18	.06	.03	.04	.26	2.5	3.5	2.5	1.4
7	.62	.33	.44	.16	.06	.03	.05	.26	48	4.0	2.3	1.4
8	.62	.35	.50	.15	.06	.03	.04	.25	31	3.8	2.2	1.3
9	.60	.34	.49	.13	.07	.01	.04	.28	3.9	4.0	2.1	1.3
10	.56	.30	.49	.10	.08	.02	.04	155	3.6	4.3	2.2	1.2
11	.55	.30	.49	.09	.08	.03	.04	7.5	3.5	5.0	2.2	1.2
12	.50	.32	.49	.09	.08	.02	.03	26	3.6	5.0	2.1	1.2
13	.50	.37	.49	.11	.08	.02	.02	27	3.6	5.0	2.0	1.2
14	.49	.29	.48	.16	.09	.01	.04	193	3.8	5.0	2.0	1.2
15	.47	.22	.48	.24	.08	0	.05	12	3.6	5.3	2.1	1.2
16	.45	.19	.47	.30	.08	0	2.7	2.5	3.5	4.8	2.6	1.2
17	.45	.22	.35	.30	.09	0	.19	3.5	7.0	6.5	2.1	1.1
18	.47	.22	.29	.38	.09	0	.22	29	4.2	4.5	1.9	1.1
19	.45	.27	.29	.40	.08	0	.26	118	4.2	3.7	1.8	1.1
20	.36	.36	.25	.33	.07	0	.12	46	3.6	3.7	1.8	1.1
21	.32	.32	.24	.35	.06	0	.13	78	3.5	3.6	1.7	1.1
22	.32	.32	.27	.30	.05	0	.16	5.8	3.5	3.6	1.6	1.1
23	.34	.31	.20	.29	.06	0	.15	2.4	3.5	4.0	1.6	1.0
24	.35	.40	.21	.15	.06	0	.15	2.0	3.5	5.2	1.6	1.0
25	.32	.44	.20	.14	.06	0	.18	2.0	3.6	4.7	1.5	1.0
26	.32	.44	.20	.18	.06	0	.15	2.0	3.5	3.3	1.5	1.0
27	.32	.44	.20	.14	.05	0	.16	2.1	3.6	3.3	1.4	1.0
28	.32	.44	.24	.10	.04	0	.17	2.2	3.8	3.3	1.4	1.0
29	.32	.27	.09	.05	.05	0	.35	10	7.0	3.2	1.4	1.0
30	.32	.27	.09	.04	.04	0	3.0	12	15	3.2	1.4	1.0
31	.32		.31		.05		1.4	2.8		3.2		1.0
Sum	15.07	8.95	11.39	6.06	2.02	0.37	9.99	744.00	190.6	125.6	61.7	36.8
Current Year 1971												
Month	Extreme Gage Feet		Extreme Second Feet				Average Second Feet	Total Acre Feet	Period 1949-1971			
	High	Low	Day	High	Low	Acre Feet						
						Average			Maximum	Minimum		
Jan.			† 1	0.79	† 21	0.32	0.49	29.9	47.2	226	1.3	
Feb.			† 25	.44	16	.19	.32	17.8	40.8	261	1.8	
Mar.			† 4	.50	† 23	.20	.37	22.6	35.8	250	.7	
Apr.			19	.40	† 11	.09	.20	12.0	20.2	148	0	
May			† 14	.09	† 28	.04	.065	4.0	9.1	49.5	0	
June			1	.05	† 15	0	.012	.7	2.8	22.3	0	
July			30	3.0	† 1	0	.32	19.8	502	4,270	1.6	
Aug.			14	193	† 2	.22	24.0	1,476	1,134	10,120	.08	
Sept.			7	48	† 1	2.1	6.35	378	344	2,634	0	
Oct.			17	6.5	† 2	3.2	4.05	249	93.5	448	0	
Nov.			1	3.2	† 27	1.4	2.06	122	45.0	182	0	
Dec.			3	1.6	† 23	1.0	1.19	73.0	72.8	693	0	
Yearly				193		0	3.29	2,405	2,347	12,633	126	

† Mean daily

† And other days

## SANTA CRUZ RIVER AT EL CAJON, SONORA

**DESCRIPTION:** Water-stage recorder, cableway, and Cipolletti weir with crest length of 26.25 feet and depth of 0.82 foot, 4.3 miles southwest of Santa Cruz, Sonora and approximately 30 miles southeast of Nogales, Sonora. Zero of gage is 4,270.24 feet above mean sea level, U. S. C. & G. S. datum, which is the same elevation as the crest of the weir.

**RECORDS:** Data is based on river stages and on current meter measurements made during the year. Data obtained and furnished by the Mexican Section of the Commission. Records available: January 14, 1954 through August 1959, October 1, 1959 through June 14, 1960; July 1960; January 6, 1961 through September 5, 1963; October 15, 1963 through August 3, 1964; January 9 through February 11 and April 1 through December 1965; January 1, 1966 through November 1967; February 8 through October 23 and December 13 through 31, 1968; January 1 through April 9, June 5 through July 30, August 15 through 24, and October 17 through December 1969; 1970; February 1 through May 23 and June 18 through November 1971.

**REMARKS:** Irrigation diversions above the station affect the regimen of the river. A flood in August 1955 destroyed the weir which was repaired in February 1957.

**EXTREMES:** Maximum instantaneous discharge, 4,590 second-feet on August 6, 1955 with stage of 6.00 feet. Minimum discharge, zero on several days during 1968, 1970, and 1971.

Mean Daily Discharge in Second Feet 1971 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	1.8	2.5	0	1.8	0	4.6	4.9	30.7	18.4	7.1	0
2	0	1.8	2.5	0	1.8	0	5.3	2.1	25.4	13.8	6.7	0
3	0	1.8	2.5	0	1.4	0	5.7	.4	23.3	10.6	6.4	0
4	0	1.8	2.5	0	1.4	0	5.7	0	20.8	8.8	6.0	0
5	0	1.4	2.5	.4	1.8	0	4.9	0	18.4	8.1	6.4	0
6	0	.7	2.5	0	1.8	0	4.9	0	17.0	7.4	6.4	0
7	0	0	2.1	1.1	1.8	0	5.3	0	18.8	6.7	6.4	0
8	0	0	1.4	1.1	1.8	0	5.3	.7	44.5	7.1	5.7	0
9	0	0	1.4	1.4	2.1	0	5.7	0	24.0	6.4	5.7	0
10	0	0	1.4	1.1	1.8	0	5.3	8.1	24.0	6.0	4.9	0
11	0	.4	1.8	.7	2.1	0	5.3	19.1	21.9	7.1	4.6	0
12	0	1.1	0	.4	2.1	0	5.7	21.2	19.8	7.1	3.9	0
13	0	.7	.7	0	3.2	0	6.7	27.9	18.4	6.4	4.2	0
14	0	1.4	1.4	1.4	3.2	0	11.3	25.4	18.7	6.4	4.2	0
15	0	1.8	.4	1.8	2.8	0	6.4	21.9	17.0	7.4	5.3	0
16	0	1.4	.7	3.5	2.8	0	6.7	11.3	17.3	8.5	7.1	0
17	0	1.4	1.4	3.9	2.8	0	4.6	8.1	20.5	16.2	6.4	0
18	0	1.1	.7	3.2	2.8	2.8	4.2	24.7	21.2	14.1	5.7	0
19	0	2.1	.7	2.8	2.5	3.5	3.2	26.8	19.4	8.5	5.3	0
20	0	2.1	1.4	2.1	2.1	3.5	3.5	21.9	12.7	7.1	4.9	0
21	0	2.8	1.1	1.8	1.8	4.2	3.5	13.4	9.9	6.7	4.9	0
22	0	2.5	1.4	1.4	1.8	4.6	5.3	30.4	8.8	6.4	4.2	0
23	0	2.1	1.8	.4	2.8	5.3	10.2	32.8	8.8	6.4	4.2	0
24	0	2.1	1.1	.7	0	4.9	8.8	54.7	8.1	8.8	3.9	0
25	0	2.1	.4	1.4	0	4.9	0	199	7.8	16.6	4.2	0
26	0	2.5	0	1.8	0	5.3	0	171	7.1	9.5	3.9	0
27	0	2.5	.4	1.8	0	4.9	1.1	159	7.1	7.1	3.5	0
28	0	2.1	.7	1.8	0	4.6	5.3	155	7.1	6.7	3.5	0
29	0	.4	1.8	0	0	4.2	4.2	156	26.1	6.4	4.2	0
30	0	.4	1.8	0	0	4.2	5.3	163	26.8	6.7	3.5	0
31	0	.4	0	0	0	0	8.5	133	0	7.1	0	0
Sum	0	41.5	38.6	39.6	162.5	1,491.8	551.4	270.5	153.3	0	0	0
Current Year 1971												
Month	Extreme Gage Feet		Extreme Second Feet				Average Second Feet	Total Acre Feet	Period 1954-1971			
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum	
Jan.	0							0	538	1,486	203	
Feb.	.07	0	21	3.5	† 7	0	1.4	80.6	435	1,598	80.6	
Mar.	.03	0	† 1	2.5	† 26	0	1.1	74.4	392	885	74.4	
Apr.	.10	0	16	4.2	† 1	0	1.4	76.0	255	711	74.9	
May	0							0	188	512	50.3	
June	0							0	148	486	63.1	
July	.46	0	14	28.3	† 25	0	5.3	315	630	1,227	83.5	
Aug.	1.90	0	30	237	† 4	0	48.0	2,961	4,666	32,603	229	
Sept.	1.05	.13	8	102	† 26	6.7	18.4	1,091	935	3,000	106	
Oct.	.52	.13	25	29.7	10	5.7	8.8	538	413	1,165	78.5	
Nov.	.20	.07	16	8.8	† 27	3.5	4.9	302	379	838	134	
Dec.	0							0	454	831	186	
Yearly									10,904	38,895	2,317	

0 Recorder inoperative

† Period includes only months and years completed

† And other days

## SANTA CRUZ RIVER NEAR NOGALES, ARIZONA

**DESCRIPTION:** Water-stage recorder, cable with sit-down cable car located 5.5 miles east of Nogales, Arizona, 0.8 mile downstream from the international land boundary and 6 miles upstream from the Santa Cruz River bridge on State Highway No. 82. Zero of gage is 3,702.54 feet above mean sea level, U. S. C. & G. S. datum (levels by International Boundary and Water Commission).

**RECORDS:** Based on current meter measurements or observation of no flow during the year. Computations by shifting control methods. Records obtained and furnished by the U. S. Geological Survey. Records available: March to November 1907 and April 1909 to December 1912 (discharge measurements and fragmentary gage height record). January 1913 to June 1922 (October 1915 to September 1916, monthly discharges only), May 1930 to December 1933, July 1935 through 1971.

**REMARKS:** Diversions in both countries affect the flow at this station. The major diversions occur in Mexico for domestic and irrigation uses. There are no storage dams above the station as of December 1971.

**EXTREMES:** Maximum discharge, 15,200 second-feet on December 20, 1967 (gage height 13.5 feet); minimum discharge, no flow for several days of many years.

## Mean Daily Discharge in Second Feet 1971 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	4.5	3.4	4.9	3.7	0.50	0	0	42	321	25	29	18
2	4.5	3.4	4.9	3.4	.60	0	0	14	157	19	27	17
3	6.1	3.4	4.2	3.7	.50	0	0	122	81	15	26	17
4	4.5	3.0	4.2	3.4	.40	0	0	8.8	61	15	23	18
5	4.9	3.0	3.7	3.4	.40	0	0	1.8	48	13	26	23
6	4.5	3.0	3.4	3.0	.40	0	0	.60	52	12	23	21
7	4.9	3.0	3.4	1.8	.40	0	0	.20	29	14	22	20
8	5.3	2.6	3.4	1.6	.40	0	0	3.0	48	13	23	36
9	4.5	2.6	3.7	1.3	.30	0	0	51	34	11	20	33
10	4.5	3.0	4.2	1.1	.30	0	0	22	22	7.6	20	31
11	3.7	3.0	4.2	.90	.30	0	0	280	18	9.4	19	23
12	3.7	2.6	4.5	1.1	.30	0	0	167	15	13	19	21
13	3.4	2.6	4.2	.90	.30	0	0	773	13	11	18	20
14	3.7	3.0	3.7	.70	.20	0	0	22	13	10	19	23
15	4.2	3.0	3.4	1.1	.20	0	0	165	12	11	19	21
16	4.9	3.0	3.0	1.1	.10	0	0	59	11	15	23	19
17	5.3	4.5	3.0	.90	.10	0	0	48	10	67	27	19
18	5.3	6.1	2.4	1.1	.10	0	0	138	11	11.0	20	18
19	4.9	5.3	1.8	2.4	.10	0	0	204	14	45	20	19
20	3.4	5.7	1.6	1.3	.10	0	0	772	11	31	20	18
21	4.9	5.7	1.6	1.1	.10	0	6.3	431	6.1	27	19	17
22	4.9	5.3	1.3	.70	.10	0	18	131	8.8	23	19	16
23	4.9	4.2	1.3	.60	.10	0	1.5	50	9.4	21	18	16
24	4.9	4.5	1.8	.60	.10	0	276	197	10	58	16	15
25	4.5	4.5	3.0	.60	.10	0	170	275	9.4	320	15	16
26	3.9	3.4	3.0	.60	0	0	2.4	205	9.4	136	18	18
27	4.2	3.4	3.7	.60	0	0	1.3	121	9.4	88	15	16
28	3.8	4.2	3.7	.70	0	0	129	300	8.2	61	17	18
29	3.8		4.2	.70	0	0	289	371	17	45	16	16
30	3.4		4.5	.70	0	0	40	348	31	39	18	15
31	3.0		4.2		0	0	74	265		34		16
Sum	136.9	104.4	104.1	44.80	6.50	0	1,007.5	5,587.40	1,099.7	1,319.0	614	614

Month	Current Year 1971								Period 1936-1971		
	Extreme Gage Feet		Extreme Second Feet				Average Second Feet	Total	Acre Feet		
	High	Low	Day	High		Low	Feet	Acre Feet	Average	Maximum	Minimum
				Day	Day						
Jan.			3	6.1	31	3.0	4.42	272	1,209	16,710	62
Feb.			18	6.1	18	2.6	3.73	207	868	11,129	59
Mar.			1	4.9	122	1.3	3.36	206	626	2,692	95
Apr.			1	3.7	123	.60	1.49	88.9	216	1,186	19
May			2	.60	126	0	.21	12.9	68	338	2
June				0		0	0	0	70	1,020	0
July			29	289	1	0	32.5	1,998	2,468	15,610	45
Aug.			13	773	7	.20	180	11,082	6,485	45,790	91
Sept.			1	321	21	6.1	36.7	2,181	1,402	7,507	17
Oct.			25	320	10	7.6	42.5	2,616	397	2,616	1.2
Nov.			1	29	125	15	20.5	1,218	298	1,218	1.2
Dec.			8		124	15	19.8	1,218	1,997	28,559	27
Yearly				773		0	28.8	21,100	16,004	57,671	3,499

φ Mean daily

† And other days

## SEWAGE INFLUENT, NOGALES INTERNATIONAL TREATMENT PLANT

**DESCRIPTION:** Two 12-inch Parshall flumes, each with a recording flow meter and continuous totalizer, one located at the international boundary for measuring effluent coming from Nogales, Sonora and the second located at the treatment plant in the influent line of secondary settling tank; and two calibrated sludge pumps of which pumping times are recorded. One pumps from primary settling tank into digester and the other recirculates sludge from secondary tank to primary tank. Bypass of raw sewage may be made to Nogales Wash, the quantity being estimated on basis of head in a control box in influent line ahead of primary tank. Nogales international sewage treatment plant is located near the north edge of Nogales, Arizona on right bank of Nogales Wash, approximately 2 miles downstream from the international boundary.

**RECORDS:** Total effluent is computed by adding to the flow measured in the flume from primary to secondary tank, the sludge pumped from primary tank into digester, which does not pass through this flume; subtracting the sludge recirculated from secondary to primary tank, which passes through this flume twice; and adding those flows of bypassed raw sewage into Nogales Wash. Flows from the United States are deduced from total measured flows less measured flows from Mexico. Records available: Continuous monthly record since the plant was placed in operation in August 1951, daily record January 1952 through 1971.

**REMARKS:** Nogales International Treatment Plant treats combined sewage from Nogales, Arizona and Nogales, Sonora by means of primary and secondary sedimentation, sludge digestion, and trickling filters. Chlorination of plant effluent, which may be used for irrigation of lands lying north of the plant, is carried out by the United States at its expense.

Month	Total Monthly Flows			Mean Daily Flows-Millions of Gallons Per Day					
	Millions of Gallons			Current Year 1971			Period 1952-1971		
	U.S.	Mexico	Total	Maximum	Minimum	Mean	Maximum	Minimum	Mean
Jan.	43.280	50.724	94.004	3.217	2.737	3.032	* 4.800	0.650	2.240
Feb.	39.550	45.913	85.463	3.460	2.756	3.052	* 6.130	.650	2.320
Mar.	44.386	47.946	92.332	3.162	2.538	2.978	4.610	.750	2.211
Apr.	42.152	48.405	90.557	3.219	2.583	3.019	4.301	.700	2.169
May	43.757	51.407	95.164	3.406	2.573	3.070	4.000	.550	2.079
June	40.098	44.448	84.546	3.123	2.550	2.818	3.800	.700	1.958
July	43.527	47.069	90.596	3.495	2.099	3.020	3.689	.700	2.018
Aug.	27.708	58.923	86.631	3.857	.750	2.795	4.928	.750	2.309
Sept.	47.073	51.997	99.070	3.765	2.768	3.302	4.541	.800	2.620
Oct.	55.429	51.061	106.490	3.804	3.106	3.435	3.999	.700	2.474
Nov.	46.656	58.439	105.095	4.016	3.104	3.503	4.016	.800	2.262
Dec.	42.693	65.867	108.560	3.894	3.202	3.502	* 5.200	.350	2.301
<b>Yearly</b>	516.309	622.199	1,138.508	4.016	0.750	3.127	* 6.130	0.350	2.247

\* Partly estimated

5 Main line broken by contractor 8-10-71, back in operation 8-14-71

## RAINFALL ON THE SANTA CRUZ RIVER WATERSHED IN INCHES

Tabulated below are the monthly records of rainfall with averages for their periods of record at stations located in the United States and Mexico. Two stations are operated and maintained by the United States Section of the Commission, three by the National Weather Service, and one by the Mexican Section of the Commission. For location, elevation, period of record, type of gage in use, and the observer, see alphabetical listing of stations on the following page.

### In United States

Month	Meigs Ranch, Arizona		Canelo, Arizona		Patagonia, Arizona		Nogales, Arizona		Nogales Sanitation Plant 2N, Arizona	
	1971	Average 1952-1971	1971	Average 1930-1971	1971	Average 1930-1971	1971	Average 1914-1971	1971	Average 1953-1971
Jan.	0	0.80	0.11	1.10	0.22	1.18	0.26	1.03	0.20	0.91
Feb.	0	.49	.97	1.08	1.20	1.03	1.03	.84	.98	.60
Mar.	0	.84	0	.76	0	.81	0	.75	0	.74
Apr.	0	.22	.36	.37	.43	.33	.27	.29	.26	.14
May	0	.09	0	.12	0	.16	0	.14	0	.08
June	.30	.45	0	.83	.94	.46	.25	.46	.18	.42
July	3.46	4.82	4.07	4.36	4.94	4.53	4.32	4.20	3.30	4.71
Aug.	7.44	4.94	5.92	4.58	6.20	4.30	7.89	4.01	8.25	4.37
Sept.	2.40	1.56	2.41	1.69	1.97	1.80	2.15	1.61	2.48	1.48
Oct.	1.99	.72	2.04	.86	2.45	.81	1.76	.71	1.71	.84
Nov.	.70	.50	.48	.74	1.12	.78	1.34	.69	.35	.54
Dec.	1.80	1.23	2.03	1.44	2.26	1.45	2.20	1.33	1.37	1.43
Yearly	18.09	16.66	18.39	17.93	21.73	17.64	21.47	16.06	19.08	16.26

### In Mexico

Month	San Lazaro, Sonora	
	1971	Average 1961-1971
Jan.	0.08	0.71
Feb.	.63	.55
Mar.	0	.67
Apr.	.35	.51
May	0	.16
June	.08	.43
July	5.91	4.88
Aug.	3.54	3.58
Sept.	1.65	1.77
Oct.	1.89	.71
Nov.	.43	.55
Dec.	1.42	1.61
Yearly	15.98	14.21

## LOCATION OF RAINFALL STATIONS IN THE SANTA CRUZ RIVER BASIN

The precipitation records of the stations listed alphabetically below begin on the date shown and extend through 1971.

## In United States

NAME OF STATION	TYPE GAGE	LATITUDE	LONGITUDE	ELEV. (FT.)	RECORD BEGAN	OBSERVER
Canelo, Arizona	S	31° 33'	110° 32'	4,985	1930	R. E. Ewing
Meigs Ranch, Arizona	S	31° 26'	110° 36'	4,836	Mar. 1952	I. B. & W. C.
Nogales, Arizona	R	31° 21'	110° 55'	3,808	1914	Milford L. Moon
Nogales Sanitation Plant 2N, Arizona	S	31° 21'	110° 56'	3,757	June 1952	I. B. & W. C.
Patagonia, Arizona	S	31° 33'	110° 45'	4,044	1930	O. J. Rothrock

## In Mexico

NAME OF STATION	TYPE GAGE	LATITUDE	LONGITUDE	ELEV. (FT.)	RECORD BEGAN	OBSERVER
San Lazaro, Sonora	S	*	*	4,199	Mar. 1954	I. B. & W. C. Mexican Section

S Standard 8" rain gage

R Recording rain gage

\* Unavailable

## TEMPERATURE, HUMIDITY, EVAPORATION AND WIND IN THE SANTA CRUZ RIVER BASIN

Tabulated below are monthly records of temperature, humidity, evaporation, and wind at the station located at the Nogales Sanitation Plant in Arizona two miles north of the international boundary. This station is operated and maintained by the United States Section of the Commission. Also tabulated below are the monthly records of temperature and evaporation for a station at San Lazaro, Sonora, located approximately 6.5 miles southwest of Santa Cruz, Sonora, and approximately 22 miles southeast of Nogales, Sonora. This station is operated and maintained by the Mexican Section of the Commission. The equipment at the Nogales Sanitation Plant - 2N consists of: Standard 8-inch rain gage, 48-inch diameter evaporation pan with stillwell and hook gage, maximum and minimum thermometer, anemometer (registers miles), hygrothermograph, and psychrometer, hand turbine type. The equipment at the station at San Lazaro, Sonora, consists of: Maximum and minimum thermometer, standard 8-inch rain gage and a 48-inch diameter evaporation pan.

For specific location of these two stations, refer to data opposite same station name shown in "Location of Rainfall Stations", page 95 of this bulletin.

### In United States

#### Temperature - Degrees Fahrenheit

Month	Nogales Sanitation Plant - 2N		
	1971		
	Mean	Max.	Min.
Jan.	45.7	85	8
Feb.	47.0	81	21
Mar.	53.5	90	17
Apr.	56.3	89	28
May	62.8	90	32
June	73.5	102	39
July	79.4	104	57
Aug.	75.5	97	48
Sept.	72.4	97	43
Oct.	59.6	87	19
Nov.	51.3	82	25
Dec.	43.4	75	19
Yearly	60.0	104	8

#### Mean Relative Humidity - Percent

Month	Nogales Sanitation Plant - 2N	
	1971	
	Max.	Min.
Jan.	100	1
Feb.	100	33
Mar.	100	23
Apr.	74	15
May	60	30
June	79	35
July	95	42
Aug.	100	77
Sept.	95	52
Oct.	100	65
Nov.	100	3
Dec.	100	51
Yearly	100	1

#### Evaporation - Inches

Month	Nogales Sanitation Plant - 2N	
	1971	Average 1953-1971
Jan.	* 3.47	3.52
Feb.	5.01	4.67
Mar.	8.94	7.28
Apr.	10.26	9.33
May	13.14	12.60
June	15.99	14.03
July	10.76	9.95
Aug.	7.50	7.53
Sept.	7.83	7.66
Oct.	5.70	6.87
Nov.	4.41	4.39
Dec.	* 3.34	3.27
Yearly	96.35	91.62

#### Mean Wind Speed - Miles Per Hour

Month	Nogales Sanitation Plant - 2N	
	1971	Average 1953-1971
Jan.	1.8	2.0
Feb.	2.4	2.3
Mar.	1.9	2.6
Apr.	2.9	2.5
May	3.2	2.5
June	2.7	2.3
July	2.0	1.5
Aug.	1.4	1.8
Sept.	1.4	1.0
Oct.	1.9	1.5
Nov.	1.3	1.5
Dec.	* 1.8	1.7
Yearly	2.1	1.8

### In Mexico

#### Temperature - Degrees Fahrenheit

Month	San Lazaro, Sonora			
	1971		1961-1971	
	Max.	Min.	Max.	Min.
Jan.	88	10	93	10
Feb.	79	21	88	16
Mar.	88	19	99	19
Apr.	86	27	106	27
May	88	39	117	28
June	100	41	124	41
July	100	52	126	52
Aug.	93	57	117	52
Sept.	95	45	115	39
Oct.	84	34	111	34
Nov.	82	23	102	21
Dec.	66	23	95	14
Yearly	100	10	126	10

#### Evaporation - Inches

Month	San Lazaro, Sonora	
	1971	Average 1961-1971
Jan.	4.17	3.70
Feb.	5.51	4.33
Mar.	8.82	7.05
Apr.	9.61	9.76
May	11.69	12.05
June	13.07	12.87
July	9.76	8.19
Aug.	5.67	6.93
Sept.	7.72	7.17
Oct.	5.71	6.93
Nov.	4.09	4.65
Dec.	2.87	3.39
Yearly	88.70	87.44

\* Estimated



**DRAINAGE AREAS ABOVE GAGING STATIONS AND IRRIGATED AREAS  
ALONG SANTA CRUZ RIVER, SAN PEDRO RIVER, AND WHITEWATER DRAW  
1971**

The drainage basin areas tabulated below are derived from the best available maps from both the United States and Mexico.

Data on irrigated areas in the Whitewater Draw Basin were furnished by the Smoke Control Section, Phelps-Dodge Smelter at Douglas, Arizona.

Designation of Areas	Drainage Basin-Square Miles			Irrigated Areas-Acres		
	United States	Mexico	Total	United States	Mexico	Total
Santa Cruz River:						
Above Lochiel, Arizona Gaging Station	82	0	82	200	0	200
Above El Cajon, Mexico Gaging Station	179	125	304	0	2,300	2,300
Above Nogales, Arizona Gaging Station	185	348	533	200	2,300	2,500
San Pedro River:						
Above Palominas, Arizona Gaging Station	92	649*	741	412	3,460	3,872
Whitewater Draw:						
Above Douglas, Arizona Gaging Station	1,023	0	1,023	20,000	0	20,000

\* An additional 47 square miles in Mexico is tributary to the San Pedro River downstream from this station

## CORRECTIONS TO PREVIOUS WATER BULLETINS

<u>Water Bulletin and Page Numbers</u>	<u>Station</u>	<u>Reference</u>	<u>Published as</u>	<u>Correction</u>
1965-39	Colorado River at Miguel C. Rodriguez in Mexico - Discharges	EXTREMES Minimum mean daily gage height Date Discharge	37.96 feet January 8, 1964 19.4 second-feet	37.86 feet June 11, 1965 1.4 second-feet
1968-95 1969-94	Location of Rainfall Stations - Santa Cruz	San Lazaro, Sonora Latitude Longitude	31° 18' 54" 110° 38' 48"	* * Add footnote at bottom of table, * Unavailable
1966-89 1967-87 1968-87 1969-86	Whitewater Draw near Douglas, Arizona	EXTREMES Maximum gage height Date	14.93 feet July 27, 1959	16.55 feet July 29, 1966